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THE
DENTAL DIGEST

Vol. XXVII FEBRUARY, 1921 No. 2

Lessons from the Bauman Case

Number Four

By George Wood Clapp, D.D.S., New York

THE SELECTION OF THE ATTORNEY FOR THE DEFENSE

Among the unescapable conclusions from the Bauman Case is that the dentist who is in danger of being sued for malpractice shall interest himself actively in the selection of the attorney who is to conduct his defense. Either the number of malpractice suits against professional men is increasing or attention has been called to them in such a way that they seem to be more frequent. It seems that no one is safe, and it will be well for every dentist to consider himself the possible object of such an attack and to prepare plans for meeting it successfully.

There is in some policies for liability insurance, if not in all, a clause to the effect that the insurance company shall have control of the conduct of the case, if a suit is brought. It will generally be found, however, that if the dentist shows an intelligent and constructive interest in the case, the company will be very glad to profit by his co-operation, and to consider the employment of any attorney he suggests.

In the selection of the attorney, the first factor to be reckoned with is that there are specialists in the legal profession just as there are in our profession, and by the time a lawyer has established a reputation, he has frequently fitted himself to follow one line of practice, with especial success. It is usually quite impossible that such a man shall be equally successful in other branches.

Thus, some attorneys have become skilful in the preparation of cases for trial but show small skill in actually trying the case in court. Others have small skill in preparing cases, but are at their best in the courtroom. Probably the best results are obtained when men of these different types join services, so that one man prepares the case, while the other tries it. Other lawyers become specialists in railroad law, corporation law, real estate law, etc. This specializing is parallel to that found in our own profession where a patient may be referred to one dentist for a radiograph, to another for extraction and to a third for artificial dentures.

It is of the utmost importance to the dentist that an attorney should be selected whose work fits him, at least in part, to grasp the essence of the professional spirit as exhibited in good dentistry. For there is behind each act, in good dental service, something bigger than the act itself. If the attorney can grasp something of the feeling of professional responsibility, if he can be taught how much there is usually to be said on both sides of important questions and how necessary it often is for the dentist to balance the pros and cons regarding any operation, and when the dentist is justified in giving the patient the benefit of the doubt, because knowledge is not conclusive, his defense will be enormously stronger than it will be if he merely knows that on a certain date the dentist did a certain thing in a certain way and obtained the results upon which suit is brought.

It seems as if a complete and successful immersion of himself for a number of years in any form of practice far removed from medical or dental considerations would make it difficult or impossible for a lawyer to grasp properly the elements upon which the dentist must largely depend for his defense, and would contra-indicate the selection of that attorney to defend the dentist's interests.

Probably 98 per cent of the men who read this article will take no steps whatever to arrange their own defense in case of possible suit. They will say, "I have practiced so many years and have never been sued. I never expect to be sued and such preparation is unnecessary." But, because perhaps two men in a hundred will take pains to prepare themselves against suit and because this case shows that any such suit may become a precedent involving the welfare of the entire profession, it is worth while to set forth here a few steps which careful dentists may take and which, in case of need, one may be very thankful to have taken.

We regard that man as unwise who postpones his selection of a dentist until, perhaps in the throes of an acute pulpitis, he is unable to select intelligently, so must take whatever service he can get quickly. We think him much wiser who, before the need for service arises, makes at least a tentative selection among the dentists of his community, based upon his understanding of their knowledge and skill. In the same way, that dentist is wise who makes at least a tentative selection among the attorneys available to him, before occasion for legal defense arises.

How shall one go about to make a tentative selection among attorneys? In communities large enough so that the dentist has no personal knowledge of the attorneys, a good way is to consult one's banker, secure a list of the attorneys in town, explain that the number of malpractice suits in all professional lines is growing, that no dentist is free from the possibility of being sued and that it is desirable to make a selection of one or more attorneys who might be approached. He will not think this act arises from fear. He will regard it merely as the

same kind of good business sense that every keen executive is exercising daily. Cross off the list the names of all men who are of shady reputation. Then cross off the names of all whose practice is far separated from medical and dental questions. See if you can learn of attorneys who have successfully either prosecuted or defended cases of a medical nature. Find out who is strong in the preparation of cases and weak in court, and who is weak in the preparation of cases and strong in court.

Perhaps the State Dental Society will have arrangement with some attorney for defending cases. This can be learned from that Society. Perhaps when an attorney has been intelligently selected, the local Society would be persuaded to effect some sort of arrangement whereby that attorney could afford to educate himself in at least the elements of the professional spirit and of dental service, so as to be ready to defend any cases that came up against the Society members. If there were 200 members in a Society and each was assessed $5 annually, an attorney could afford to take $1,000 worth of his time to keep posted on medical and dental subjects, attend the Society meeting and get a lot of valuable preparatory knowledge.

In any community sufficiently small to permit it, get acquainted with the one or more attorneys whose names have been selected. After the acquaintance is established, it will not be found difficult to make occasions to tell the attorney some interesting story in dentistry, either from one's own practice or of some case of which the dentist knows. These stories should never aggrandize the dentist himself, but should always connect good dental service with life and health. The purpose of these stories is to establish in the attorney's mind an understanding of the professional spirit in dentistry. One can not be served with a notice of a suit on Monday, select an attorney on Tuesday and have this spirit developed in him by Wednesday. It was not developed in us in that time and will not be in anyone else. And that spirit and a reasonable amount of dental knowledge are of immense importance to the dentist whose interests are to be defended.

Of course, the happiest combination will result when such an attorney can be found among one's patients or can be secured as a patient. There would then be many opportunities not only to develop the right conception of dentistry, but to impart a great deal of dental knowledge along many fundamental lines, either while serving the attorney himself or while serving the attorney's family. Fortunate, indeed, is that dentist who has among his patients an attorney whom he would be justified in trusting to defend him in case of suits for malpractice.

Development of Opportunities in the Defense

The defense in the Bauman case bristled with opportunities which seem to a dentist not to have been improved. Here was a patient who was ill when he presented for treatment. Here was a pulp, dead but

not liquefied. The patient rejected the advice for extraction or radiograph, largely because there never had been any history of pain or trouble from the tooth and there was no indication of inflammation or pus up to the last visit on March 25th.

The patient broke every appointment. Treatments which were placed to be effective for forty-eight hours were compelled by him to carry over from seven to seventeen days. Approximately five weeks after the first treatment, an acute abscess developed, burst into the mouth and discharged freely. This was the first sign of pus formation about the tooth.

Probably about twelve days after the bursting of the abscess, the physician attending Mrs. Williams found Mr. Williams sick, located an abscess in the scalp at the back of the head, made an incision and permitted pus to drain out. The patient grew progressively worse and dies eighteen days later of general septicaemia.

It seems to the non-legal mind that no sufficient effort was made by the attorney for the defense to develop contributory negligence on the part of the patient. On February 18th, the patient was given a treatment intended to be effective for forty-eight hours and an appointment to return in forty-eight hours. He did not return for seven days. He was then given another treatment intended to be effective for forty-eight hours and another appointment to return in forty-eight hours. He did not return for seventeen days. It might have been possible to show that this neglect by the patient went far to nullify the best efforts of the dentist.

Following the testimony of Drs. X and Y that the acute abscess which burst in March was the probable cause of the septicaemia which developed nearly two weeks later, when there had been for several days an established fistula through the gum, no efforts were made in cross-examination to compel X and Y to establish the minute anatomical conditions by which the abscesses in the scalp could have been established from pus absorbed at the tooth. In the opinion of competent pathologists, it would have been extremely difficult, if not impossible, to establish this connection, and if the attorney for the defense had led them into this field, it is quite possible that their testimony could have been discredited before they left the stand.

It seems impossible to find that the correct story of the therapeutic action of Formo-cresol, as seen by the defense, was ever gotten before the jury. The statements of X and Y on this subject, which were very damaging, were certainly not offset by the testimony on the opposite side, although a great weight of evidence favorable to the defense, on this question, could have been produced.

The experience of the dentists in the county with X-ray photographs was not gotten before the jury, although there was in court, on at least

one of the days of the trial, one of a group of dentists in New Rochelle who had been actively interested in the operation of the only X-ray machine known ever to have been installed in a dental office in New Rochelle up to that time, who could have established that the results to all of the group from the interpretation of the radiographs were so unsatisfactory that the use of the machine was discontinued.

It was not shown that the dentists of the country did not refuse to operate on teeth which patients had refused to have X-rayed or extracted. This would have established Bauman's procedure as that common in the community at the time.

The attitude of the leading colleges in the country toward the use of Formo-cresol in conditions such as those described by Dr. Bauman was not presented to the jury although correspondence would have shown that in 1916 a majority of the leading dental colleges were using Formo-cresol and teaching its use to students, and that they were using it in 1920.

The strategy of defense in a legal action may not be the same as the strategy of defense in war. We have read the statement of competent military authorities that attack is the very best form of defense. This case seems to the medically and dentally trained mind to present many opportunities for very effective attacks upon certain statements of the most important witnesses for the prosecution. So far as the record of the case shows, these appear not to have been utilized by the defense.

The witnesses for the defense in this case state that they had either no conferences with the attorney before the trial or very short and incomplete ones. They had insufficient opportunity to present to the attorney information in their possession which they knew to be dentally important. Suggestions which they made as to important technical material within their knowledge were neglected. Dr. McLean prepared, for the attorney, a series of ninety-seven questions of which the attorney asked only a few. Some of the unasked questions follow:

> Q. Dr. X stated that the preparation "Formo-cresol" which Dr. Bauman used in Mr. Williams' tooth is made up of equal parts of formalin and cresol. Is that correct? A. No. 38 per cent to 40 per cent formalin.
>
> Q. How do you know it does not liberate enough gas to cause pressure? A. Does not contain enough gas to cause pressure.
>
> Q. Is there any other drug which acts in the manner Dr. X has described and which in your opinion he may have confused with Formo-cresol? A. Yes. Hydrogen Peroxide.
>
> Q. Have you produced a lantern slide to show the court the difference in the gas liberating properties of the two drugs? A. Yes.
>
> Q. How long does it take Formo-cresol to liberate its gas? How

far would it be likely to penetrate into a non-vital tooth containing a non-vital root? A. Two to four days. About one-half way to end of root at first application, etc.

Q. Have you ever before seen or heard that claim advanced by Dr. X that the hermetic sealing of Formo-cresol in a tooth would be a cause of septicaemia? A. Never.

Q. In examining dentists for the State of New York would you accept it as a correct answer? A. No, sir.

Q. Have you any idea how many treatments of Formo-cresol you have personally sealed hermetically in non-vital teeth? A. About 15,000.

Q. Was Formo-cresol used widely in dental practice as Dr. Bauman used it four years ago? A. Very widely.

Q. Was it taught in colleges and text books? A. Yes, sir.

Q. Produce a standard text book. When published? Read. A. Burchard and Ingles Dental Pathology and Therapeutics, Buckley Materia Medica.

Q. Is it widely used today? A. Probably more than any other one drug.

Q. Is septicaemia frequently caused by a dental abscess? A. Practically no cases on record.

Q. Dr. X and Dr. Y have both spoken of the amputation of the ends of the roots of a tooth having a chronic blind abscess at the end of its roots. Have you ever performed this operation? A. Yes, sir, very often.

Q. Have you produced slides? A. Yes.

Q. Is it a practical operation as applied to the upper first molar? A. No, sir.

Q. Why not? A. Three roots, depth of lingual root in bone, maxillary sinus and too far back in mouth to be readily accessible.

Q. What would you say the symptoms indicated in Mr. Williams' case (i. e., pains in back of head, loss of weight and run down condition) indicated? A. May have indicated an infection (foruncular) already present, or rheumatism or nerve tension or may even have been caused by a kidney condition, as the patient is said to have had albuminuria.

Q. Have you yourself had any non-vital teeth removed from your own mouth to cure pain in the back of your head or elsewhere? A. Yes, sir.

Q. Please explain. A. To cure pain in the back, shoulder and back of head.

Q. Was the treatment successful? A. No.

Q. Is there any direct channel or communication between the upper right molar or the maxillary sinus over it, and the back of the head? A. No.

Q. Is there any way in which the physician in charge of the case could have demonstrated whether or not the supposed infection at the back of the head was caused by the tooth? A. Yes; by culturing both head and tooth.

Q. Have you produced lantern slides showing X-ray pictures of cases in which you treated and saved non-vital teeth? A. Yes.

Q. Have you saved many such teeth? A. Yes.

Q. Why not (speaking of whether Dr. McLean would take an X-ray of a non-vital tooth today if a case like Williams' presented to determine whether a chronic blind abscess was present to which he answered, "No.")? A. Presence of non-vital pulp makes it unnecessary for purposes of diagnosis.

Q. Have you produced a lantern slide showing an X-ray of a similar tooth? A. Yes.

Dr. Twiggar prepared eight questions of which the attorney asked two.

It is undoubtedly within the province of the attorney conducting the defense of a case to determine what portion of the knowledge possessed by his technical witnesses shall be employed and what shall be omitted, but when men of the highest professional standing in a field in which he is not adequately trained, recognize that the prosecution is very naturally getting into the records only those citations and expressions favorable to its cause, and that these can be offset by opposing citations of equal value and by a little further examination of those who make the assertions, it seems to the non-legal mind that the attitude of the attorney selected to defend the case should be one of receptive consideration, and that the interests of the defense would be well served by the utilization of an adequate amount of authority whose viewpoint is favorable to the defense.

No one can tell where the next case, in which the interests not only of a single dentist, but of the whole profession are involved, will occur. But it is worth a few hours of thought on the part of any dentist to select carefully the attorney who will make careful preliminary preparation and an effective presentation in court; and to firmly resolve within himself that in case he is threatened with a suit, he will to the best of his ability aid his attorney in developing, in advance, every point which the prosecution can attack, in placing before his attorney adequate technical information upon every such point, and that he will labor with his attorney until he has not only a proper understanding of the professional spirit in dentistry, but a knowledge of the application of that spirit to the problems and decisions of actual practice.

Studies on the Leverage Problem of the Mandible*

By Alfred Gysi, D.D.S., Zurich, Switzerland

Two questions regarding the human mandible have been long and sometimes bitterly discussed. They are:

Which class of lever is represented by the human mandible during the mastication of hard or tough food?

How is the force of the muscles exerted upon the condyles and the teeth?

Prior to 1912, the action of only one-half of the mandible was considered. A bolus of food was considered as present between the maxillary and mandibular teeth and the action of the working half of the mandible in crushing it was studied. The muscle pull and distribution of force occurring on the balancing half of the jaw during the crushing movement were either overlooked or assumed to be the same as those in the working half. Such studies regarded each half of the mandible as a lever of the third class and seemed to show that from one-third to two-thirds of the muscular force exerted on the mandible was not effective in the teeth. For this reason, some students regarded the mandible as one of nature's failures.

Since 1918 there has grown up a new school of thought about these questions. This school says that the mandible is not a lever, and gives three reasons:

First. That the mandible is merely suspended by the muscles attached to it and that the resultant force of these muscles acts in perpendicular and parallel lines, directly upon the teeth.

Second. That the condyles could not be fulcrums, because they articulate with inclined, highly lubricated surfaces and so are not sufficiently stable in position.

Third. That during trituration, no muscular force is exerted upon the condyles.

Since 1913 I have given these questions nearly continuous study, and I have the honor to make to you the first formal presentation of some of the results.

I believe that each of the two schools of thought to which I have referred is partly right and partly wrong. Each has made accurate observations, but each has drawn wrong conclusions. It seems to me that by utilizing the observations already made and adding to them some very important factors which were omitted, a thoroughly scientific and tenable theory of muscle pull and force distribution during the crush-

*Read before the Faculty of the College of Dental Surgery, Columbia University, New York, October 6, 1920.

ing movement can be formulated. Such a theory stands half-way between the two schools, and, like the peacemaker in all walks of life, is exposed to the attacks of both. I shall try to present that theory and then to support it with evidence drawn from my investigations.

My Theory of Mandibular Levers

When soft food is crushed on both sides of the mouth at the same time, each side of the mandible is a lever of the third class, with a fulcrum in the condyle. Hard or tough food can be crushed on only one side at a time.

During such crushing, the muscle pull makes of the balancing side of the condyle a lever of the third class, with a strong fulcrum-making force exerted at the condyle. The muscle pull on the working side tends to make that side into a lever of the third class, also with a strong fulcrum-making force at the condyle. But the force which comes from the balancing side through the lever symphysis to the working side not only aids in crushing the food, but reduces the fulcrum-making force at the working condyle.

When food is crushed at the bicuspids, the fulcrum-making force at the working condyle is slightly reduced. When food is crushed at the location of the mandibular second molar, the fulcrum-making force at the working condyle is neutralized. Very hard food can not be crushed on the mandibular third molar, because the downward pull of the fulcrum-reducing force on the working side would be great enough to tear the ligaments.

During the crushing of hard food, and while the maxillary and mandibular teeth are separated by that food, the vertical components of the muscle pull are the ones most powerfully exerted. When the mandibular teeth come into lateral or protrusive occlusion with the maxillary teeth, important lateral forces come into action. These work anteroposteriorly in the incising bite in the direction of the longitudinal groove of the molars; and transversely in the direction of the linguobuccal grooves of the molars during side bite. During the crushing and triturating of food, the movements are constantly intermingled.

I have determined the directions and amounts of the longitudinal and transverse components of the muscle pull in mastication, but the limits of this paper prevent their consideration here. I shall, therefore, consider only the vertical components, which are most powerfully exhibited in the action of crushing hard or tough food.

A Few Simple Facts About Levers

Our studies of mandibular movements will be made much simpler if we first consider some of the simple principles of levers, and then apply them to the levers which are being constantly established in the body to permit of some action, perhaps of only a moment's duration.

The Standard Dictionary says that a lever is a mechanical device, consisting of a rigid structure, turning freely upon a fixed point or fulcrum, and intended to apply pressure or to change the direction of motion. And it mentions the human jaw as a lever by which the direction of motion is changed.

It follows that if any point of a rigid structure becomes fixed at any time during a movement, so that the rest of the structure moves about it and either imparts pressure or changes the direction of the motion, the structure becomes a lever and the fixed point a fulcrum. And this remains true, even if the fixed point is released from fixation as soon as the particular motion is complete.

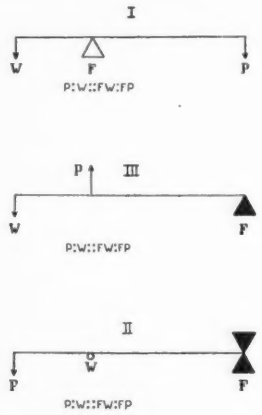

Fig. 1

We operate great numbers of levers in the body to permit our simplest actions. In order to close one of your hands tightly, you must operate at least fourteen levers, and perhaps many more. One can not walk or run or jump or do any work with the arms or legs without operating extensive systems of levers.

An Extensive System of Levers

I recently witnessed the establishment of one of the most extensive series of levers of which the body is capable. A golf professional was teaching a pupil to drive. The rotation of the body, the bending of the arms and wrists, and the completion of the long, swinging stroke called for the interaction of a multitude of levers.

The important point which I wish to get into your minds lies just behind these statements. It is that the fulcrums of many of the levers engaged in these acts are not permanently stationary anatomical points, but are hinge or ball-and-socket or gliding joints which are temporarily

fixed in a position by the exercise of muscular force. Thus, in the backward stroke in golf, the right foot, leg and hip become successively fixed after short motions and serve as fulcrums for more extended motions by the vertebral column. A little later, the vertebrae become fixed and act as fulcrums for the completion of the upward and backward swing by the arms and wrists. This whole system of levers is dissolved by the downward swing.

I want you to see that any articulating joint may be fixed by muscle action at any stage of its possible motion and become just as much a fulcrum for lever action as if it were a rigid anatomical structure. If I can make this point plain, it will solve one of the greatest difficulties heretofore present in studies of mandibular motion, because it will enable you to understand how a condyle may be fixed in position by muscular force and become the fulcrum for a mandibular motion.

The statement that from one-third to two-thirds of the muscular force exerted upon the mandible is not exhibited in the crushing power of the teeth is true, but that force is not lost. It is required to fix the condyles, as fulcrums, upon the inclined and lubricated surfaces of the eminentia and is exerted by four groups of muscles, the temporals and external pterygoids and the internal pterygoids and masseters. These fix the condyles in position from four directions—antero-posteriorly and laterally.

The Functions of the Mandible

One occasionally meets a dentist who feels that because only a portion of the muscular force exerted upon the mandible is manifested through the teeth, nature has not planned the mouth as well as she should, and that the mechanical arrangements could be greatly improved. This view must arise because civilized life has led that dentist to overlook some of the most important purposes of the mouth. The mouth is an important weapon of offense and defense in many animals and was once undoubtedly so in man. It was, also, an organ of prehension. It is still an important organ of grasping food and of speech.

If nature had desired the mouth to be used only for grinding food, it could have been made efficient with the expenditure of much less muscular force by attaching muscles between the nose and the chin, leaving an opening on the side through which food could be inserted. But no improvements of arrangement which permit the functions of fighting, grasping, speech and mastication have so far been suggested, and we shall do well to study the arrangement as we find it, attributing the faults to our knowledge rather than to the construction.

The Problem to be Studied

The problem to which I invite your attention this evening is that of showing that the action of the mandible during the crushing of hard

or tough food can not be properly understood by studying the construction or movement of one-half of the mandible alone. I shall try to show that during such crushing the mandible acts as two inter-acting levers, and to make plain how the force of the muscles engaged in the vertical crushing movement is distributed throughout these two levers.

The new light which I wish this address to throw upon the problem consists in the presentation of information as to the action of the balancing side of the mandible when the working side is engaged in crushing hard or fibrous food by a vertical crushing motion.

The Method of Presentation

There are three quite distinct methods by which this information may be presented, the mathematical, the experimental and the graphic.

In the mathematical method the available data are given, and there are deductions obtained through the use of physics, algebra and differential calculus. This method is tiresome in presentation and difficult to understand.

In the experimental method the methods followed and results obtained are shown by means of models.

In the graphic method diagrams and pictures are employed.

I shall combine the experimental and graphic methods of presenting this information as being less tiresome, easier to understand and quite as accurate. Each statement I shall make has been proved by all three methods. I regard it as one of the best evidences of the accuracy of the claims that identical results are obtained by all three methods. These results are much closer to the facts than in any previous investigation. Heretofore, the observer has been within 25 to 50 pounds of the force. I have worked the forces out to the second decimal place and could have carried them further if it had been necessary or wise.

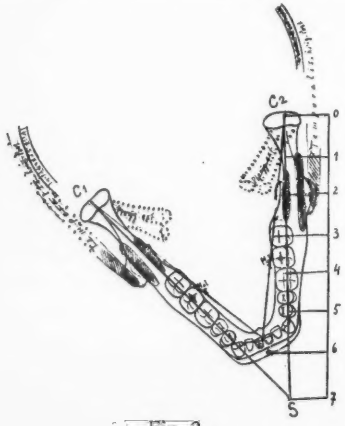

Fig. 2

If an average human mandible be diagrammed as shown in Fig. 2, the lines C1S and C2S may be drawn from the centres of the heads of the condyles through the tips of the buccal cusps of the mandibular teeth until they meet at the point S, in the median line. This is the geometrical point at which the levers constituting the sides of the mandible are considered to join, and through which force is transmitted from one side of the mandible to the other.

If the line C2S be divided into seven equal parts, we shall obtain some interesting information, and a plan for the illustration of the experiments which are to be described. Point zero of this line is located at the centre of the head of the condyle. Point 2 marks the location of the centre fibres of the internal pterygoid, the masseter and temporal muscles; it is thus the centre of all the muscles which act to close the mandible and exert vertical crushing force upon objects between the teeth. Point 4 marks the location of the disto-buccal cusp of the first molar; it and the head of the condyle are equidistant from point 2. Points 3 and 5 mark the second molar and the first bicuspid, respectively.

The experimental work of the evening will consist in applying an upward crushing force to an object representing a mandible, and the recording and interpreting the forces which are imparted to different parts of the experimental mandible thereby. This crushing force will be constant in all experiments. A force of 12 pounds has been chosen because that figure is divisible by 2, 3, 4, and 6, and the results come in simple figures.

This force will be applied always at the location of point 2, which you have seen to mark the centres of the closing muscles. It will be applied at first to a single lever representing one side of the mandible, without relation to the other side. We do this because this is the way in which the leverage problem of the mandible was studied for many years.

Then the force will be applied equally to each side to show how the mandible works when soft food is being crushed on both sides at once.

It will then be applied equally to each side to show how the mandible works when hard or tough food is crushed only on the working side.

It will be sufficient for our purposes if we record and interpret the forces which are imparted to the mandible at points 3, 4 and 5, representing the first bicuspid, the first molar and the second molar, respectively.

Fig. 3 is from a drawing of a single lever representing one-half of the mandible as it has been studied in the past. It is mounted in a framework of which the upper part represents the base of the skull. The lower part is an arbitrary construction to permit the attachment of spring balances to record upward pressure at the condyle and at

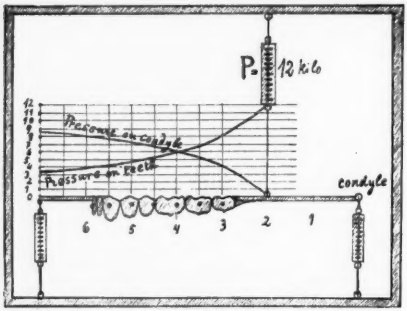

Fig. 3

other desired points. At point 2, which represents the location of the centres of the muscles engaged in the crushing movement, a cord and a spring balance marked "P" (Power) are attached. A threaded bolt is carried from the spring balance upward through the framework representing the base of the skull and there is a wing nut above the frame so that the force can be increased. A spring balance is inserted between point zero and the base of the frame and another spring balance, which can be moved to any desired point upon the lever, is here shown between point 7 and the base of the frame.

It is a principle of physics that any upward force applied at point 2 would be reproduced at points zero and 7 in quantities determined by the distance of those points from point 2. Since the construction of the model corresponds closely to the anatomical construction of the masticating apparatus, and point zero represents the location of the condyle, it follows that any force recorded by the spring balance extending downward from point zero represents the amount of upward pressure by the condyle upon the eminentia articularis. Any upward pressure recorded by the spring balance when placed just posterior to point 6 represents the pressure exerted by the mandibular incisors against the maxillary incisors.

Above the teeth, in the diagram, are seen several horizontal lines, numbered at the left from 0 to 12. Each of these lines represents the application of one pound of force by the spring balance at P. Crossing the horizontal lines are vertical lines drawn upward from points 3, 4, 5, and 6, and also from points half-way between each two of these. These lines merely carry the locations of points 3, 4, and 5 across the lines representing the application of force.

There can be seen a curved line running downward and forward from the lower end of the spring balance P. Where this line crosses the vertical lines from the points mentioned, it crosses a horizontal line or the space between two such lines. Following the horizontal line or

space to the left, one may read the amount of force exerted upon the teeth when twelve pounds of upward force are exerted at point 2. Thus, the vertical line above point 4, at the middle cusp of the lower molar, shows that the upward force of twelve pounds in the spring balance, representing the vertical component of the masticatory muscles, develops a force of six pounds in the first molar.

In the same drawing is a curved line running upward and forward from point 2 on the lever. This line represents the amount of force developed in the condyle by an upward pressure of twelve pounds in the spring balance P, when the hard food which is to be crushed is respectively at points 4, 5 and 6.

As the force recorded at the condyle is that portion of the upward force of twelve pounds exerted at point 2 which is not exerted through the teeth, the sum of the forces recorded by the two curved lines must always equal twelve. Thus, the force exerted at point 4, which is equidistant with the condyle from point 2, is six pounds and the force exerted in the condyle is six pounds. At the lower incisor point, just distal to point 6, the force exerted in the teeth is four pounds, and the vertical force exerted at the condyle is eight pounds.

There is no justification for the statement that if a vertical upward force of twelve pounds is exerted by the closing muscles and only four pounds of vertical force is exerted by the incisors, eight pounds of force is lost. That eight pounds of vertical muscular force is required to fix the condyle in position as a fulcrum for the exertion of the four pounds by the incisors. If the eight pounds of force were not exerted by the muscles in fixing the condyles, it would be impossible for the incisor to exert four pounds of biting force. This force of four pounds, applied through the sharp incisal edges, is quite as effective in work as the greater force applied through the broad molar surfaces.

It seems to me that the mechanical construction of the masticating apparatus and the agreement of computations and experiments effectively destroy any notion that one-half of the mandible is not a lever of the third class, even when studied independently of the other half.

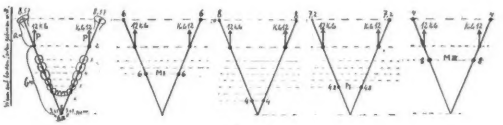

Fig. 4

We will now study in the graphic manner the distribution of vertical force when one masticates on both sides at the same time. This form of mastication occurs only in connection with foods which require insalivation rather than trituration, such as, mashed potato, spinach, cooked cereals, etc.

Fig. 4 shows a diagram of a mandible with the lines drawn from the heads of the condyles to the lever symphysis, as in Fig. 2. These are the lines along which force applied at any point in either line is transmitted. The positions of the teeth are shown by outlines and the seven divisions of the mandible which were discussed in a previous diagram are here shown by the figures at the right. At point 2, which, you will recall, locates the centre fibres of the muscles engaged in the closing action of the mandible, is attached, on each side, a spring balance similar to that shown in the preceding diagram. The point of special difference is that one such balance is attached to each side of the mandible, or two in all, where we formerly had but one.

Through each of these spring balances, a vertical crushing force of twelve pounds is to be applied to the mandible, making twenty-four pounds in all. By means of spring balances used in the same way as in the former diagram, the upward force resulting in the condyles and at points 3, 4, 5 and 6 will be registered. As, in theory at least, no part of the force is lost in friction, the entire force applied at the points 2 must be manifested in some part of the mandible.

If we examine first the results at points 4 of applying twenty-four pounds at points 2, we find that six pounds of upward force are developed at each point 4, and six pounds in each condyle. This distribution of force results from the fact that the points 4 are at the same distance from points 2 as are the condyle heads, and the force is thus evenly divided. The force at the points 4 is vertical, upward, crushing force. The force in the condyles is expended as fulcrum-making force. Without this holding of the condyles, crushing by the molars would be impossible.

In the same way, the application of twelve pounds of vertical, upward force at each point 2 develops four pounds of crushing force at each point 6, with eight pounds of fulcrum-making force in each condyle. It develops four and eight-tenths pounds of crushing force in each first bicuspid, and seven and two-tenths pounds of fulcrum-making force in each condyle. At each point 3, opposite the third molars, it develops eight pounds of crushing force and four pounds of fulcrum-making force.

We come next to a study by the graphic method of the phenomena which occur when hard or tough food is masticated. The mandible is incapable of masticating such food on both sides at the same time, though muscular effort is exerted on both sides at once. We must, therefore, study the effects of the application of force to both sides of the mandible and the distribution of that force when a small, hard object is between the teeth on one side.

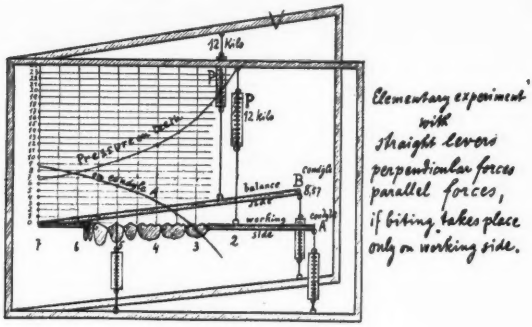
12 Kilo
P
12 kilo
balance
working side
Elementary experiment with straight levers perpendicular forces parallel forces, if biting takes place only on working side.

Fig. 5

Fig. 5 is a diagram of the apparatus which I have shown you. It differs from the diagram of the single lever principally in that the lever is double, that power is applied at two points, and that there is a resistance balance at each condyle and a movable testing balance which can be placed at the location of any tooth.

The horizontal lines for diagramming the amount of force and the vertical lines indicating positions of points 3, 4, 5 and 6 are shown as before. The curved lines representing the vertical, upward force developed in the teeth and condyles are determined as they were in Fig. 3. The curved line representing the fulcrum-making force developed in the condyles extends below the level marked for one pound. The reason for this will be explained. If you will bear this form of diagram in mind, we can now examine diagrams of simpler form which show the amounts of force generated at different parts of the mandible, when a vertical crushing force totaling twenty-four pounds is exerted at the two power balances marked "P."

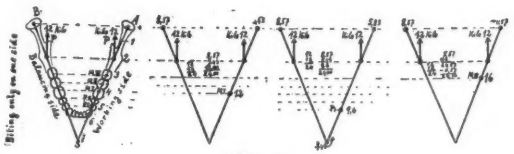

Fig. 6

In Fig. 6 the lines from the heads of the condyles to the lever symphysis correspond to the levers of the mandible shown in the previous diagram. The points at which we are to study the distribution of force are indicated by the same numbers as in previous diagrams.

Diagram "A" represents the distribution of force when the small, hard object to be crushed is between the maxillary and mandibular first molars of the left side. Of the total of twenty-four pounds of vertical, crushing force applied to the mandible at the power balances, twelve

pounds are exerted at this molar, eight and fifty-seven hundredths pounds at the balancing condyle and three and forty-three hundredths pounds at the working condyle. You may recall that when twenty-four pounds of crushing force were applied to soft food distributed evenly on both sides of the mouth at this point, six pounds were exerted at each first molar and six at each condyle. The six pounds then exerted at the first molar on the right side have passed through the lever symphysis and are exerted at the left first molar. The distribution of fulcrum-making force in the condyles has been changed by the introduction of other factors.

I am going to ask you to perform, right where you sit, an experiment which will help you to understand this application of force. Please drop the right arm straight down by the side with the palm forward. Now, bend the right elbow so that the right forearm extends forward at right angles with the arm. Imagine a relatively heavy weight suspended at the wrist. You understand that the forearm is a lever of the third class with the fulcrum at the elbow and that if force enough is exerted at the wrist to support the weight, a considerable force will be exerted at the fulcrum also.

Now, place the left hand beneath the right hand and lift. You will realize at once that the weight on the right wrist will be supported with the expenditure of less force by the right arm and much less pressure on the fulcrum at the right elbow. This experiment is similar to the action which occurs when muscular force is exerted on both sides of the mandible to crush food on one side. The force exerted by the left hand corresponds to the force from the muscles on the balancing side. This force comes around the lever symphysis of the mandible and is exerted on the hard food to be crushed.

Diagram "B" of Fig. 6 shows the distribution of force when the food is at the location of the first bicuspid.

The distribution of force through the condyles is extremely interesting. No matter where the food is located, the vertical, upward pressure at the balancing condyle remains constant, at practically one-third of the total force applied. The further back the food moves, the less the pressure at the working condyle, until a condition is established in Diagram "C," where the working condyle is actually pulled downward out of the cavity.

(To be continued)

Colored Rubbers

By George B. Snow, D.D.S., Long Beach, Cal.

(Fourth Paper)

Dental rubbers are almost invariably of some shade of red, and this color is given to them by the incorporation of mercurial sulphide, or vermilion. As this substance is found in the shops it is sometimes contaminated with Salts of Arsenic. These are well known to be irritant poisons. The vermilion which is used by rubber manufacturers is said to be carefully tested for arsenic, and if any traces of it are found, the vermilion is rejected as unsuitable for use in compounding dental rubbers.

There has been considerable written for and against the use of red vulcanite as a base for artificial dentures. Although its presence in the mouth seems to be tolerated in most cases, there are persons who appear to be peculiarly susceptible to the influence of mercury. Such cases are by no means infrequent and a few of them have come within the cognizance of the writer; the symptoms ranging from an obstinate chronic diarrhea to irritation of the fauces, or a simple Hyperaemia of the mucous membrane where it came in contact with the vulcanite. These symptoms were usually relieved by the substitution of black vulcanite for the red, a fact which pointed unerringly to the cause.

A dark red rubber known as "Maroon" is used extensively under the impression that the coloring matter it contains is not vermilion but oxide of iron. Inquiry instituted among manufacturers of Dental Rubbers has brought out the fact that this is a mistake. Vermilion is used in maroon rubber, the same as in ordinary red rubber; the desired shade being obtained by the use of a dark colored vermilion, or modified by the addition of Ivory Black, or some similar pigment.

A very remarkable instance of red rubber poisoning is narrated here. A lady nearly fifty years of age was wearing a partial upper plate which was retained by Gilmore attachments, and was of the horse-shoe variety. It becoming necessary to extract the remaining natural teeth, the plate received suitable additions to complete the alveolar arch, and also a web of maroon vulcanite to cover the palate. It was observed that the web thus added was much redder in color than the ordinary maroon rubber, but this fact passed without remark, and an attempt was made to wear the plate. Almost immediately thereafter considerable irritation was manifested in the mouth accompanied by a profuse flow of saliva. About three weeks elapsed before any change was made in the plate, and then the newly added palatal web was cut away and black vulcanite was substituted therefor. During this time the patient had been able to eat but little, and she lost about 20 pounds in weight. In less than a day after the substitution of the black vulcanite the un-

toward symptoms subsided, and the denture was then worn with comfort until it was replaced by another—a period of several months. The dentist professed to be unable to account for the trouble that was experienced as he had used, not red, but maroon rubber, he believing that the maroon rubber was not colored with vermilion.

These dentures, both upper and lower, were afterwards replaced by new ones. Black vulcanite was used for the upper plate, but when the lower one was vulcanized, a momentary forgetfulness resulted in the use for it of maroon rubber.

These two dentures have now been in use for over a year; the upper one has not given a particle of trouble, but the lower one has caused frequent annoyance. Little points will appear upon the gum, which are very sensitive. There is no discharge from them, and treatment with astringents causes them to disappear; but they frequently recur.

Why there should be the difference between the behavior of maroon rubber in this lower plate and the violent symptoms which ensued when it was used in patching up the predecessor of the present upper plate is a matter of conjecture. The web of maroon rubber which proved to be such an irritant was very light colored and may have been insufficiently vulcanized. Be this as it may, there is no question about the violence of the symptoms which followed the attempt to wear the plate after the addition of the maroon rubber web, and their immediate subsidence after the substitution of black rubber for maroon. The patient had previously worn partial sets of red vulcanite, which produced the milder symptoms that are mentioned above. These disappeared entirely upon the substitution of other dentures of black vulcanite. This case exemplifies the severest and the mildest symptoms arising from the use of red vulcanite that have come under the observation of the writer.

Just how far the use of any kind of red rubber as a base for artificial dentures is warranted, is a question which each dentist must decide for himself. It is probable that no deleterious effect is produced in the majority of cases; but on the other hand it is possible that in many instances patients suffer uncomplainingly when such effects are not very marked, not suspecting their cause. The late Dr. L. P. Haskell, of Chicago, was very outspoken in his opposition to vulcanite, and especially so as regards red vulcanite. When he was in practice, in Boston, Mass., many years ago, his work was done with gold or continuous gum as bases. Upon his return to that place after an absence of thirty or forty years he found some of these plates still in use and apparently retaining their fit, there having been but little or no absorption of the alveolar ridges under them.

It is well known that at the present time, absorption of the alveolar ridges is a common occurrence when vulcanite dentures are worn. It is

still a question how much of this is to be laid to the effect of a constant, though slight irritation, consequent upon the use of red vulcanite.

It is often the case that from motives of supposed economy, little or no attempt is made to preserve the natural teeth, but they are deliberately allowed to decay so that they may be extracted and replaced by artificial dentures. The teeth are very often sacrificed before the patient has arrived at the age of twenty-one years, and the writer is of the opinion that in such cases absorption of the alveolar processes goes on much more rapidly than when the natural organs are retained until after the age of forty-five or fifty. Whether or not red vulcanite has anything to do with accelerating absorption, the writer is unable to say, positively, but if it is productive of a constant, though slight, irritation of the mucous membrane, it may produce absorption, and he sees no good reason why black vulcanite should not be preferred to red in most cases.

It is contended that vermilion is medicinally inert, but a reference to the Dispensatory shows that although it is but seldom employed, doses are given internally of from ten grains to half a dram. Metallic Mercury is also said to be medicinally inert, but in a state of fine division, as in Blue Mass, it is employed and has considerable power, and inhalation of mercurial vapor is one of the most efficient means for producing salivation. It is used when it is important to bring the system under the influence of mercury in the shortest possible time, the vapor being produced by throwing vermilion upon red hot iron.

STALE RUBBERS

At one time nearly all of the rubber supply of the world was obtained from territory contiguous to the River Amazon and its tributaries. It was brought to the City of Para, near the mouth of the river, and marketed from there, and went under the name of "Para Rubber." The latex or milky juice of the rubber trees was gathered by the natives, and dried upon clay-covered wooden paddles, they being held over a smoky fire for this purpose. As the demand for rubber increased, rubber trees were planted in tropical regions in various parts of the world, and the rubber, hence obtained, became known as "Plantation Rubber." The Plantation Rubber was obtained by coagulation of the Caoutchouc from the sap by the addition of a vegetable acid. The process differs entirely from that used in obtaining the Para Rubber, and the product is not so permanent. While all crude rubber is subject to deterioration after a time, the Plantation Rubber is much more subject to change.

It would appear that the crude gum absorbs gases from the atmosphere, and that these are given off during the vulcanizing process. A number of years ago the writer noticed the occurrence of bubbles under the surfaces of vulcanite plates, varying in size, sometimes being

nearly as large as half a hemp seed. The surface of the vulcanite was apparently perfect, but when a scraper was applied it would break through the surface and expose one or more unsightly holes. An attempt being made to vulcanize some black Dental Gum which had been on hand for a few years, it appeared that the product was subject to this same defect, although the same rubber had been used successfully when it was first procured. It was afterwards found that these bubbles would appear in vulcanite which was not over two millimeters in thickness.

The writer is not aware of any remedy for this condition, and would warn dentists against keeping Dental Gum in stock for more than a few months. So far as his experience goes red rubber is less liable to change than black.

Death of Dr. Lewis

The following Resolutions were offered by Dr. Low concerning the death of Dr. T. G. Lewis, of Buffalo, N. Y., which occurred on November 28th, 1920:

Whereas, in the death of Dr. Lewis of the Eighth District Dental Society, we have occasion to mourn the loss of one of the most public spirited, generous, straightforward, and honorable men who ever practised dentistry. Born December 14th, 1836, he had more than rounded out the full span of a remarkably useful life, acquitting himself always to the honor of our profession, and

Whereas, we deplore his loss, it is with thankfulness that our bereavement is tempered by the knowledge that even to the hour of his death he retained full possession of all his faculties, and that the Almighty was merciful in not permitting him to suffer. Having throughout his eventful life achieved that character and degree of true success which money cannot buy, be it

Resolved, that memorial pages be set apart in the records of our Society in order that his achievements may be more fully chronicled, to the end that we may each strive to emulate his example and thus accomplish the things worth while in all life's endeavors. And be it further

Resolved, that the Dental magazines be requested to publish suitable obituaries, and that together with these resolutions copies be given to his bereaved widow and family.

The Evolution of Man

By Dr. Samuel Herder, New York, N. Y.

In the treatment of human teeth, whether it is for the purpose of correcting malocclusions, or otherwise restoring the efficiency of the masticatory apparatus, the study of biology has become a valuable contributing factor.

Experiments upon the lower animals, with a view to determining the effects of improper nutrition, as well as experiments to determine the effects upon them, of a number of other human diseases with which they have been inoculated, have resulted in adding a wealth of knowledge to the medical and dental professions.

In order to give the average dentist a little insight into the subject of biology, broaden his dental vision and encourage him to dig further into this subject, I am presenting this article. Feeling certain that it will prove exceptionally interesting, I would urge the reader not to pass it over as a "dry theory" but to do it the justice of reading through to the end.

Chas. Darwin and Evolution

To the work of the indefatigable and fearless mind of the immortal Chas. Darwin, is due the promulgation of the most remarkable theory every advanced. This epoch-making theory in the realm of science which has already been accepted as a law, is known as the Theory of Evolution.

It is this great theory of evolution, with particular reference to man, that the greatest biologist the world has ever known owes his great number of contemporary hostile criticisms. It is to this same theory, also, that Chas. Darwin owes his undying fame, while many of his less far-seeing critics have been long dead and forgotten.

This law of evolution gives every student of biology, a firm and sound basis upon which to carry on biological work. Thus, it has changed the previously existing chaos into cosmos.

Out of the seemingly hopeless and chaotic condition of scientific thought which held sway up to his day, the clear-thinking mind of Chas. Darwin brought order and calm. It must not be forgotten also, that to many of his contemporaries, such as the lucid Thomas Huxley, are due the credit of possessing the courage of their convictions in supporting Darwin in many of the invaluable truths which he so ably and nobly propounded. Chas. Darwin has indeed displayed the mettle of the true scientist, when he refused to accept a theory as truly valuable unless he was able to substantiate it by facts carefully studied in the open field, upon the sea, in his own private laboratory, or in any other suitable place.

His clearly established fact, which like the Rock of Gibraltar has weathered the storms of time is, that man has gradually evolved from

the lower animals. The brief consideration of the process of this wonderful evolution is the province of this essay.

The Process of Evolution

With just how the first spark of life was produced, after the earth had sufficiently cooled down from its previously molten state to enable it to harbor life, we are not concerned. We do know that animal life began its existence with a single-celled organism such as the amoeba or protozoa. These gradually evolved into multi-cellular organisms.

This process of development can be more readily understood when we study the simple-celled human ovum in the uterus of the mother during the period of gestation. It undergoes a most interesting and wonderful evolution. The cell becomes divided and subdivided until a large multi-cellular mass is produced. This mass becomes specialized in various parts of it, and continues in its specialization process until the human embryo is developed, and further still, until the full-grown normal infant is born. Through proper care and nourishment, the infant is carried through the various stages of childhood, puberty, adult-life and old age. Finally he succumbs to the last stage, known as death.

During the process of the proper functioning of normal adult life, we find the same process of evolution and development mentioned above. The completion of each process forms a cycle, and at the end of each cycle a new cycle is started. It is interesting to note that the result of each cycle produces an organism which is materially altered in character by the change in its environment. Since the environment usually improves, the organism also improves with it.

From the simple invertebrates such as the amoeba and the jelly-fish, the vertebrates have gradually evolved. These vertebrates or animals possessing vertebrae, gradually evolved from the simple to the more highly complex type.

The Classes of Vertebrates

Considering the various classes of vertebrates in the order of their development from the lower to the higher, we have: 1st, the fishes. The tadpole which is in reality the infant frog very closely resembles the fish. After it has fully developed, we have the frog, which is an entirely different class of animal. Instead of living entirely in the water, as does the fish, this animal lives both in water and on land. For this reason it comes under the class known as amphibious. The next class in the order of evolution is the class known as the reptiles, such as the crocodile, lizard, snake, etc. Their resemblance to the fish, for example in their scales, is clearly evident. The next class in order is the birds. These can very readily be connected in their development from the reptiles by examining the skeleton of the Arthaeopteryx of Bavaria, which is the oldest bird skeleton known. "It is the size of a crow; has

teeth in both jaws; a long tail like a lizard's; a strange wing well developed, yet unfinished, with its three digits ending in claws." Although it has many characteristics of a reptile, it has more characteristics of the bird class to which it belongs.

The next and last class of animals in the order evolution, is the mammals. The connection of the mammals with the birds may be clearly illustrated by observing the Australian duck-bill. This animal has web feet, a bill, lays eggs, and after hatching them out, proceeds to suckle its young. The fact that it suckles its young, has rudimentary teeth, etc., places it definitely among the mammals.

In summarizing what has been said above, we find that animals have continued and still continue to evolve from the simple organism to the more complex ones; that all animals adapt themselves to their environment, or perish when they are unable to do so. Thus through environmental conditions, which include heredity, the over or under-functioning of animal organs, and natural selection, the simple-celled organism has evolved into the multi-cellular organism; the invertebrates into the vertebrates; the fishes into the amphibians; the amphibians into the reptiles; the reptiles into the birds; and the birds into the mammals, which are the most highly developed and most intelligent of all the classes of animals.

The Mammals

We will now continue our study of the class known as mammals. The mammals have been subdivided into three classes, namely: (1) the Prototheria, (2) the Metatheria, (3) the Utheria.

The Australian Duck-bill and the Spiny Ant-eater belong to the first class. Both of these animals hatch their young from eggs, and then proceed to suckle them.

The Marsupials, for example, the Kangaroo, give birth to their offspring when it is still in its foetal state. Each mother of this class of animal, grasps the young foetus newly born, by the lips of the mouth and places it into that part of its dermal appendage which is known as the pouch, where it is kept for months.

The third class, or Utheria, has been further divided into nine classes. In the order of their increasing development they are: (1st) the Edontata; (2nd) the Electecea, such as whales and porpoises; (3rd) the Sirenia, such as the sea-cow, some of the characteristics of which are, that it swims in the sea and has teeth and hair; (4th) the Ungulata, or hoof animals, which are herbivorous; (5th) the Carnivorous animals some of the characteristics of which are that they have fur and a modified set of teeth, known as canine teeth, which are used for killing and tearing their prey.

At this point it may be of particular interest to call attention to the fact that in earlier years, for example in the Stone Age and the Bronze

Age, man had a greater need for this same type of teeth for fighting purposes. As time went on, this variety of teeth, known as canine teeth, which he possessed in conjunction with other varieties has degenerated compared to its previously very marked development. So we find the Iron Age, as well as the later periods of human development, in which wonderfully constructed cutting and fighting implements were used (to take the place of his canine teeth) that these teeth were greatly reduced in their general development.

The sixth class, the Rodents, includes squirrels, rats, beavers, etc. These animals possess well developed incisor teeth, which are chisel-shaped and are used for gnawing purposes.

The seventh class, the Insectivora, includes such insect-eating animals as the shrew.

The eighth class, the Bats, includes animals which have well developed wings, but do not grow feathers.

The ninth class, the Primates, is the last and most highly developed class of all living animals.

The Primates

Some of the distinguishing features of the Primates are: Prehensile limbs, each of which terminates in five digits with a flat nail to each digit. One of the digits of the fore-limbs is called the thumb, and is opposable to the other four digits. The same thing is true of the hind limbs, which have instead of thumbs what is known as large toes. The property of opposability in the hind limbs is greatly reduced as we reach man in his early savage state, and is very markedly reduced in man of the present day.

The Primates gradually evolved in the following order: the Monkeys, the Apes, and finally Man.

The lowest type of monkey is the Lemur. It lives among the trees and uses all of its four limbs as well as its long prehensile tail for grasping branches of trees, etc. The prehensile-tailed Spider monkey is an advance in monkey-evolution.

Among the Apes, which are the next in the order of evolution, we have the Baboon, which is the lowest type of ape. The so-called Dog-faced Baboon looks like a dog. It walks on all four limbs, but sits up erect when resting. Living as it does in the clearer fields and on the ground, it has no need of a tail either for a balancing rod or for prehensile purposes.

The Anthropoid Apes are nearest to man in their development. They have no tails, for the reason already mentioned; they sit up erect and are therefore flat-chested, in contradistinction to the animals which always walk on "all fours," and therefore have rounded chests and abdomen. They have relatively large brains, being much more highly developed over the orbits than the lower animals. The development of

the cerebrum over the cerebellum, particularly at its posterior region deserves particular notice, in the study of Anthropoid apes. Some examples of anthropoid apes are: the Gibbon, Orang-a-tang, Chimpanzee and Gorilla.

The gorilla, which is the closest to man in development, shows strikingly interesting characteristics. It walks upon the soles of its feet very much like man. It assumes a semi-erect posture, and walks on "all fours" only a very small part of the time.

In reconsidering what has already been said, we can readily see the very definite relation of man to the lower animals, as well as the relation of the lower animals to each other. This can be more clearly understood when we observe the very close relation of the following similar organs in the very different types of animals: the arm of a frog; the paddle of a turtle; the wing of a bird; the fore-leg of a horse; the flipper of a whale; the wing of a bat; and lastly, the arm of man.

Man

In considering man the highest type of Primate, we note the following characteristics: Man is a social animal just as certain kinds of monkeys are. On the other hand, he is the only living animal which has a language which he translates into articulate speech. He is the only consciously intelligent denizen of the world. Although man came from the same stock as did the other primates, there is a wide gap between him and the highest primate next to him, namely, the gorilla. It is therefore very ridiculous indeed, to endeavor to place them anywhere near the same plane of high functional development. Man is the only animal which has so highly developed the property of the opposability of the thumb to the other four fingers of his hand. This has enabled him to make the great progress he has made in the direction of civilization. I might say in conclusion, that just as man has evolved from the lower animals, through the instrumentality of environment, so ideal future man will evolve to a much higher type of human organism, through the same instrumentality in the form of intelligent education.

Upon the quality and degree of this education rests the lot of future mankind.

616 Madison Ave., N. Y. City.

Synergistic Anesthesia for Oral and Dental Surgery

By Dr. M. Ecker, New York City

Extract from Bulletin No. 7 of the National Anesthesia Research Society.

The method to be described was evolved after using nitrous oxid-oxygen alone in over 55,000 cases. To date the new method has been used in over 5,000 cases. The brain block is incomplete and the condition of the patient not always satisfactory with nitrous oxid-oxygen alone. Hence the use of synergists for oral and dental as well as surgical anesthesia. Nitrous oxid-oxygen in sufficient quantity to produce unconsciousness is passed over a solution of paraldehyde and anesthol, 50 per cent. each, to produce a perfected brain block and operable anesthesia. In the experimental clinical investigations Cotton Process ether was used but its after effects were unpleasant. Anesthol was used but was not quite satisfactory enough. Paraldehyde was tested but its synergism added little to the value of nitrous oxid-oxygen alone. Also a mixture of ethyl chloride in oil was tried but even the use of 2 drams per patient was not beneficent enough to continue its employment. Finally the solution of paraldehyde and anesthol was found to be the ideal synergist to nitrous oxid-oxygen. Ten drops of anesthol is the average amount used for each patient.

The induction period averages one minute and a half, using nitrous oxid-oxygen alone for the first 15 seconds; after this anesthol and paraldehyde as synergists until the completion of the operation. The induction is smooth and any restraint unnecessary. Oxygen is used from the beginning of anesthesia and the patient is pink from start to finish.

A safer and deeper anesthesia is maintained throughout than with the older method, jactitation being almost entirely absent and patients making no movement to inconvenience the operator. Recovery is smoother with less tendency to hysteria and patients can walk unassisted from the chair to the waiting room. Nausea and vomiting are negligible.

Using the face mask the operating period averages from 1 to 2 minutes in comparison with 30 seconds with the gases alone. Using the nasal inhaler anesthesia can be continued indefinitely. Finally as a consequence of the increased safety, ease and comfort of operating the physical and nervous strain of the older method upon the operator or anesthetist is obviated and this conservation of energy is a factor that should not be ignored.

Local Anesthesia

C. E. Fellman, D.D.S., Harvard, Nebr.

IT is the purpose of this article to give expression or emphasis to certain phases of the subject. Diffuse anesthesia is specially useful in painful operations on the upper first molar and the bicuspids in cases of patients under twenty years of age. In older patients this injection does not succeed.

Pressure anesthesia should be employed in preference to nerve blocking, as in the former method, the element of danger is absent. In this connection bulk novocaine is more certain in its action than the adrenalene and cocaine formerly used. The remedy is to be injected through a newly formed cavity rather than by attempting to operate through the cavity of decay. The same rule is of value when arsenic is employed; in the latter case an anodyne is sealed into the cavity of decay.

In any case, after the bulbous portion of the pulp has been removed, the remainder can be anesthetized by pumping novocaine into the canal. Wrap a few cotton fibres around a smooth broach and carry the bulk novocaine into the canal.

A simple and efficient means by which an anesthetic condition may be secured in cases of hypersensitive dentine is in the use of desensitizing paste.

The best time for administration of local anesthetics is in the morning or early afternoon. In the late afternoon, owing to the fatigue of the patient administration is painful and results poor.

Nerve blocking does not produce a bloodless operation—far from it. In every case there is hemorrhage which prevents filling the canal at the first sitting. Another disadvantage is the resulting paralysis of the sensory nerves involved, which continues for a couple of hours.

Painfulness of the injection is another disadvantage. Were it not for this fact local anesthesia could be employed more extensively in the treatment of children's teeth. Owing to the cartilaginous nature of bone in childhood, the anesthetic is absorbed very readily. The tissues overlying the alveolar process are very sensitive in early youth.

In any case, wherein a decision to inject has been reached, the mucous membrane over the area of puncture should be primarily anesthetized as follows: Place on the slab a mass of bulk novocaine equal to the mass thereof contained in a one-third grain tablet. Roll a pellet of cotton three eighth inch in diameter, grasp with cotton plier, dip into water, throw excess water from cotton by passing it rapidly through the air. Pick up novocaine with cotton and you have a saturate solution of novocaine. Rub cotton over area of puncture back and forth several times, then let cotton lie between the cheek and process while further preparations are made.

I do not believe that this method is injurious to the mucous membrane. If, however, the membrane is dried and certain remedies containing tincture of iodine are applied the membrane may be destroyed. Hence the germicide should be applied to the moist mucous membrane. If the latter is very delicate H_2O_2 may be used.

If nerve blocking is to be employed permanently in the profession, it must be employed in a judicious and intelligent manner. My opinion is that the pain, swelling and other unfortunate results following nerve blocking are always due to faulty technic, generally infection. In palpation (feeling) for anatomic land marks, the tip of the left index finger should be used, the syringe being held in the right hand. Just before locating the area for puncture, the mucous membrane should be painted with some preparation containing iodine and the first joint of the left index finger should also receive a liberal coating thereof. In preparing to make the injection, the finger nail should be cut and the finger scrubbed. After the finger has been coated with iodine, nothing should be touched therewith excepting the membrane. The iodine wears and washes off in course of a short while. Beside the ordinary pus microbes, and others which may act as pus microbes, one should be on guard against tetanus, and erysipelas. The tetanus bacillus is to be found in the soil of streets and gardens. Its presence in dust is to be suspected.

Instruments required for nerve blocking are a four-CC all glass syringe, a steel needle an inch and a half long, and a small evaporating dish to be employed in boiling the solution. If tap water is employed in deep injections, it should be boiled before use. Before use, the syringe should be immersed in alcohol for a few minutes. Ordinary denatured alcohol of commerce will do if the syringe is thoroughly rinsed inside and out several times with clear water before use. The needle must be boiled before use. After the injection a wire should be run through the needle or the solid constituents of the remedy will form a plug near the middle which may not be removable.

Before attempting to block nerves, one should study the subject.

If in terminal anesthesia too much novocaine is injected into a limited area, sloughing will occur, exposing the bone. In such a case an application of crystal silver nitrate will check the pain and stimulate new growth of investing tissues. One application is sufficient.

The great advantage of novocaine over cocaine lies in the fact that the former is practically non-toxic while the latter is decidedly so. When cocaine is injected, toxic symptoms are observable in about one case in seven, while with novocaine toxic symptoms are absent unless the remedy is injected into a vein. With cocaine local disturbances follow in about one per cent of cases. Following the use of novocaine local symptoms resulting from the drug are absent.

In cases of delayed healing and in all ulcerative conditions of the mouth, irrigations with Dakin's solution are valuable. In ozena, following coryza or influenza, applications of the same made with the nasal douche are very efficient.

Dinner to Dr. Frank T. Van Woert

On February 17, 1921, the Kings County Dental Society will tender a testimonial dinner to Dr. Frank T. Van Woert, the eminent specialist, at the Hotel Bossert.

An elaborate musical program has been arranged, and many prominent speakers have accepted invitations to address the diners.

The executive committee of the Kings County Dental Society are making extensive arrangements for the occasion, and are sparing no expense to make the affair one long to be remembered.

Reservations can be made by applying to Dr. Henry G. Sachter, 32 Court Street, Brooklyn, the President of the Society, or Dr. J. R. Schwartz, 235 Utica Avenue, Brooklyn, Chairman of the Executive Committee.

Willow Trees

The willows have a golden way
Of shining on a cloudy day;
There is a secret they all know,
Keeps them smiling in the snow.

I've met people on the street
Within whose eyes a still and sweet
Secret of sorrow seemed to wait
Like some strong watcher at a gate
Aware of danger, but without
Any restless fear or doubt.

I always tell myself that these
People are like willow trees,
Dressed for happy times, although
Standing in the wind and snow.

—N. Y. Times.

Index of Dental Literature

The welcome announcement is made that the first volume of the much needed Index of Dental Literature will be ready about January 1st, 1921. This book will contain about six hundred pages, 7½ x 10¼ inches, printed on high-grade paper and bound in buckram. The following is from the announcement, and is worthy of your most careful perusal, and we are sure your support will be forthcoming.—(Editor.)

Our literature is the record of our progress. Advancement from year to year should be based on the foundation of former years. An index is necessary to make the treasurehouse of the past available.

The dental profession has been making wonderful strides in recent years: The world-wide mouth hygiene movement, the advanced requirements for admission to our schools, the lengthening of the course from three to four years, the recognition accorded dental service by our Government, the reorganization of our National and State Societies, the development of dental research and the proved relationship of mouth infections to general health have all combined to elevate dentistry to a position long coveted.

The one thing needed to sustain this forward movement—a complete index of our literature—is now so well along that a volume covering five years is in the hands of the printers and additional volumes are being rapidly prepared.

The Index is in two parts:

PART I *is a classified subject index* of papers, discussions and clinics as published in dental journals in the United States, England, Canada, Australia and New Zealand. There are 40,000 articles classified under about two hundred headings so that one may easily find all the articles on any desired subject. For each article is given the number of pages, devoted to discussion, etc. The task of finding what has been written on any subject has been completed once and for all.

PART II *is an alphabetically arranged author index,* giving a list of books, papers, discussions and clinics—a complete record of the contributions of each man towards the progress of the profession, as recorded in our journals.

This is not a publication for profit. The work has been done under the direction of Dr. Arthur D. Black of Chicago without remuneration, and is being published under the auspices of the American Institute of Dental Teachers, composed of the faculty members of the dental colleges in the United States and Canada. The Schools have guaranteed a part of the cost, the remainder must come from private subscriptions. *All who desire copies must order in advance.*

This volume will cover the five years from 1911 to 1915 inclusive. It will contain over 500 pages. A second volume covering the period

from 1916 to date and others for the years prior to 1911 are in preparation.

The publication of this index will immediately enhance the value of all dental journals, which are being rapidly accumulated in medical, dental and public libraries throughout the land. Heretofore our journal literature has been almost useless soon after publication for lack of an index, it being impossible to find articles on particular subjects.

This is an undertaking which will be supported by those who are serious in their desire to see dentistry advance. Are you one of this group? If so, send in your order at once.

ABRAM HOFFMAN, *Secy.-Treas.*,
381 Linwood Avenue, Buffalo, N. Y.

1920 Classification of Dental Schools of the United States by the Dental Educational Council of America

CLASS A

University of Southern California, College of Dentistry, Los Angeles, Cal.
University of California, College of Dentistry, San Francisco, Cal.
Northwestern University Dental School, Chicago, Ill.
University of Illinois, College of Dentistry, Chicago, Ill.
University of Iowa, College of Dentistry, Iowa City, Iowa.
Harvard University Dental School, Boston, Mass.
Tufts Dental College, Boston, Mass.
University of Michigan, College of Dentistry, Ann Arbor, Mich.
University of Minnesota, College of Dentistry, Minneapolis, Minn.
St. Louis University Dental School, St. Louis, Mo.
Creighton University, College of Dentistry, Omaha, Nebraska.
University of Buffalo, Dental Department, Buffalo, N. Y.
Ohio State University, College of Dentistry, Columbus, Ohio.
North Pacific Dental College, Portland, Ore.
University of Pittsburgh, College of Dentistry, Pittsburgh, Pa.
The Thomas W. Evans Museum and Dental Institute, Univ. of Pennsylvania.
Vanderbilt University, School of Dentistry, Nashville, Tenn.
Medical College of Virginia, School of Dentistry, Richmond, Va.
Marquette University, College of Dentistry, Milwaukee, Wis.

CLASS B

College of Physicians & Surgeons, Dental Dept., San Francisco, Cal.

Colorado College of Dental Surgery, Denver, Colo.
Georgetown University, School of Dentistry, Washington, D. C.
George Washington University Dental School, Washington, D. C.
Howard University Dental School, Washington, D. C.
Atlanta-Southern Dental College, Atlanta, Ga.
Louisville University, College of Dentistry, Louisville, Ky.
Chicago College of Dental Surgery, Chicago, Ill.
Indiana Dental College, Indianapolis, Indiana.
Loyola University, School of Dentistry, New Orleans, La.
Tulane University, School of Dentistry, New Orleans, La.
Baltimore College of Dental Surgery, Baltimore, Md.
University of Maryland, Dental Department, Baltimore, Md.
Washington University Dental School, St. Louis, Mo.
Kansas City-Western Dental College, Kansas City, Mo.
University of Nebraska, College of Dentistry, Lincoln, Neb.
New York College of Dentistry, New York, N. Y.
College of Dental and Oral Surgery of New York, New York.
Western Reserve University Dental School, Cleveland, Ohio.
Ohio College of Dental Surgery, Cincinnati, Ohio.
Philadelphia Dental College, Philadelphia, Pa.
University of Tennessee, College of Dentistry, Memphis, Tenn.
Meharry Dental College, Nashville, Tenn.
Baylor University, College of Dentistry, Dallas, Texas.

CLASS C

Jersey City Dental College, Jersey City, N. J.
University of West Tennessee, Memphis, Tenn.
Texas Dental College, Houston, Texas.
Cincinnati College of Dental Surgery, Cincinnati, Ohio.

NOTE: These classifications were all made upon the basis of the requirements in force prior to April 30, 1920.

ALBERT L. MIDGLEY, Secretary.

DENTAL LAWS

The Training of the Dental Hygienist in the U. S. A.

By Alphonso Irwin, D.D.S., Camden, N. J.

That phase of training for the dental hygienist which we intend to outline is best indicated by presenting some of the questions which have been addressed to us by persons residing in this country and abroad.

I. What are the dental hygienists in America?

Definition: A dental hygienist is a person licensed after examination by a Board of Dental Examiners in the United States of America, to assist a registered dentist, in his offices, by cleaning the teeth and mouth of patients and performing such services as may be directly connected therewith. The dental hygienist is also employed in public and private institutions to perform prophylactic work and teach oral hygiene for patients and children.

II. What is the title of the dental hygienist?

There is no *legal* title for the dental hygienist. He or she may be addressed as Mr. or Mrs., or Miss, as the case may be, according to the usage prevailing in polite society.

III. What are the duties of the dental hygienist?

The duties of a dental hygienist can only be performed under the general supervision of a licensed and registered dentist. Such duties consist of removing calcareous deposits, accretions and stains from the exposed surfaces of the teeth, and directly beneath the free margins of the gums, but (he or she) shall not perform any other operation upon the teeth or mouth. She may teach oral hygiene, especially to children, instructing them in the uses of the toothbrush and their adjuncts and conducting toothbrush drills. She should perform the clerical work connected with her duties, such as attending to appointments, correspondence, bookkeeping, card-indexing, and keeping records of all work done.

IV. What are the requirements for admission into a reputable dental hygienist school?

Eligibility. The age for matriculation varies from eighteen to twenty years, according to the school entered. All applicants must possess a good moral character. The minimum preliminary education requirement is at least one year's accredited High School education; the maximum requirement being the full four years' course of an Accredited High School, according to the requirements of the dental

hygiene school selected. The entrant must also present at least two properly endorsed references, one of whom must be a regular licensed ethical dentist. He or she must then pay the required fees, attend the full graded course of lectures and perform the clinical work stipulated, and pass the required examinations for graduation. In New York the requirements for admission into the Dental Hygienist School, Department of Dentistry, of Columbia University, are the qualifying certificate obtained from the Department of Education of the State of New York at Albany, New York, the completion of at least four years of high school work, and the attainment of at least nineteen years of age. Full information may be obtained by addressing the Dean, 437 West 59th St., New York City, New York.

V. What schools give regular courses for the Dental Hygienist?

Colorado College of Dental Surgery, University of Denver, cor. Arapahoe and Fourteenth Sts., Denver, Colorado. Address: A. W. Starbuck, D.D.S., Supt., 1340 Arapahoe St., Denver, Colorado.

Columbia University, Dental Hygienist School, 35 West 39th Street, New York City, New York.

Dr. Alfred Fones' Dental Hygienist School, Bridgeport, Conn.

Ohio College of Dental Surgery, Dental Nurses and Assistant Course. Address the School, at 116 Garfield Place, Cincinnati, Ohio.

Forsyth-Tufts Training School for Dental Hygienists, Harold DeW. Cross, Director, 140 The Fenway, Boston, Mass.

The Rochester Dental Dispensary, Dr. H. J. Burkhart, Director, Rochester, New York.

The following universities are said to have a dental hygienist course:

University of California, College of Dentistry, Parnassus Ave. and Arguello Boulevard, San Francisco, California.

University of Minnesota; for full particulars address The Registrar, University of Minnesota Dental School, Minneapolis, Minn.

Vanderbilt University, School of Dentistry, R. Boyd Bogle, M.D., D.D.S., Dean, Hitchcock Building, Nashville, Tennessee.

VI. *Fees.* The expenses vary in different schools, ranging from $55.00 to $156.00 for the completed course, according to the school entered. Books, instruments, materials and incidentals are extra, and may run up from $25.00 to $100.00 according to the wants of the student. The entrance fee is $5.00 in the majority of schools, though $6.00 is charged by some Universities. The sessions are divided into two parts, and the fee for tuition in each ranges from $25.00 to $75.00. A dental hygienist may take the year's course for $100.00 tuition fee in the majority of schools in the United States of America.

Statement: The purpose of school courses of training is to ground intelligent and ambitious young women in the theory and practice of oral prophylaxis and dental hygiene, so that they may become qualified

candidates for a license to do prophylactic work under the supervision of a registered dentist in public clinics or private offices, or wherever their services may be required. The courses cover an academic year of nine months and are usually divided into two sessions; the Fall course, beginning the latter part of September, including the Winter, and the Spring Course, usually starting about the first week in February and ending the last week in May. Illustrated lectures, motion picture films, life-size manikins with movable cheeks, lips, mandibles, neck and head to simulate the movements of the human counterpart, are used in specially-designed class rooms, after pre-arranged schedules, to instruct students in a graded and systematic manner. The courses are planned to qualify the student to practise her vocation skilfully and scientifically, with specific reference to operative dexterity for prophylactic work and tact to impart knowledge to others in regard to oral prophylaxis, adequate and systematic care of the teeth, toothbrush drills and instruction to children in public clinics, such as schools, infirmaries, hospitals, dispensaries, factories and various municipal and industrial plants where dental hygienists are now employed.

Practical instruction is given in the schools for dental hygienists by experienced teachers, and consists of digital and manual training with instruments, first by the carving of tooth forms, then learning how to operate upon the manikin head with flexible organs, followed by actual work upon living patients for the remainder of the year. *The courses are regulated according to the rules of the Dental Educational Council of America.*

VII. How are dental hygienists licensed?

They are licensed after examination by State Boards of Dental Examiners.

Procedure: The dental hygienist makes application to the Secretary of the Board of Dental Examiners in the State wherein she proposes to locate, for a printed form which must be filled out according to instructions and forwarded to the Secretary in accordance with the directions given by him. If the applicant's qualifications are acceptable to the Board, he or she will be notified when, where and how to appear for the examinations. All applications must be accompanied by the examination fee, and in the possession of the Secretary at least a week before the date of examinations. The subjects for the theoretical or written examination are usually Anatomy, Physiology as related to the mouth, teeth and head, Dental Histology, Bacteriology and Sterilization, Dental Caries and Malocclusion, Oral Prophylaxis and Oral Hygiene. A study of operative instruments and appliances, Anaesthetics, and Physical Diagnosis, Dental Medicine, Radiology, Bookkeeping, and Officekeeping is sometimes added.

The practical examination usually consists of the following procedure: Every applicant must bring a patient upon whose teeth tartar deposits can be distinctly seen. The patient must have at least twenty-four natural teeth in the mouth. No attempt to cleanse the mouth previous to the examination. The examination consists of (1) scaling the teeth, (2) polishing the teeth, (3) instructing the patient in regard to the home care of the mouth and teeth, including the uses of the toothbrush and its accessories, (4) oral quizzing by the examiners concerning these tests. The applicant must come provided with suitable instruments and materials, including two toothbrushes, to perform the above mentioned operations. Chairs, tables and cuspidors only are furnished by the Board of Dental Examiners.

VIII. *Fees for licenses and registration.* The fees charged by State Boards of Dental Examiners are almost uniformly $10.00 for conducting examinations, payable in advance. New York State charges $5.00, while Tennessee charges $25.00 for examination. The cash must accompany the application. If the candidate should fail upon the first examination, she is granted a re-examination free of charge; but a third examination requires the payment of $5.00 additional. The examination fee in no case is refunded. A license certificate usually costs $1.00 additional. Annual registration with the Secretary of the Board of Dental Examiners is compulsory, for which a fee of $1.00 is due. In some states, such as New York, registration with the Regents is necessary. Some States have a dental hygienists' reciprocity clause, and the fee for an interchange license is $20.00 (Minnesota, for instance).

IX. What States have passed Dental Hygienists' Acts?

Alabama, Colorado, Connecticut, Iowa, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New York, Oklahoma, and Tennessee. Eight States are reputed to be actively engaged in promoting the passage of dental hygienists' acts, namely, California, Illinois, Montana, North Carolina, Ohio, Pennsylvania, Vermont, Washington. Other States are discussing the feasibility of adopting similar enactments.

X. This article would be incomplete unless it made known the fact that the Dental Hygienists' Acts are armed with *teeth*. Violations of the provisions of such acts are punished by revocation not only of the license of the dental hygienist, but also of the registered dentist under whose watchful care the dental hygienist is supposed to perform her duties.

We also transcribe the Alabama Dental Hygienist Act, which at this date is the latest enactment upon that subject:

ALABAMA

Amended Law approved September 29th, 1919. Section 1. (A) 38th line, Dental Hygienist defined: "Any person shall be said to be practicing dental hygiene within the meaning of this Act who shall remove deposits, accretions and stains from the exposed surfaces of the teeth and polish same; provided, that nothing in this Act shall interfere with the employment of a dental hygienist by a licensed dentist or public institution or school or hospital under the general direction of a licensed dentist." . . . . . .

4. That said act (of 1915) be and the same is hereby amended by adding thereto, Section 29, as follows: Section 29—"Any person who shall hereafter desire to practise dental hygiene in this State shall pass an examination given her by the Board of Dental Examiners of this State, under such rules and regulations as said Board deems fit and proper to formulate. The fee for said examination shall be ten dollars, and any applicant failing to pass said examination shall be entitled to take a re-examination at the next regular examination of the said Board, at which time she shall be exempt from the payment of the examination fee. The said Board of Dental Examiners shall issue certificates to practise as dental hygienists in this State to those who have successfully passed said examination.

"Provided, however, that no person shall be entitled to take said examination unless said applicant shall be twenty years of age, and of good moral character. Every person receiving a certificate to practice dental hygiene in this State from said Board of Dental Examiners shall pay a certificate fee of five dollars to the said Board for each certificate or duplicate certificate issued, and on or before the first day of October of each year, every licensed dental hygienist shall register his or her certificate with the said Board, according to regulations formulated by the same by said Board, and shall receive from said Board a certificate of such registration, which certificate of registration shall be her sole authority from said Board to practise dental hygiene in this State, and an annual registration fee of one dollar shall be paid to said Board for such annual registration certificate. In case of default in payment of such fee of one dollar for a period of sixty days, said license certificate shall be automatically revoked; provided, however, that the payment of such fee of one dollar after the expiration of such sixty days, with an additional sum of five dollars, shall restore said license certificate. All laws and parts of laws, either general or special, in conflict herewith are hereby repealed."

Approved September 29th, 1919.

Ethical Parables

Number 9

By George Wood Clapp, D.D.S.

In reply to the philosopher's inquiry, the dentist said, "I believe I can give you a demonstration of the application of ethics to practice, because I have been ethical all my professional life."

"Is your practice successful?" asked the philosopher.

"Sometimes I think it is and sometimes I feel sure it is not," replied the dentist. "I pay my bills promptly, but I have not been able to lay up anything for old age, and I am no longer young."

"It is high time," said the philosopher, "that in justice to yourself and your family, your competency should be well under way."

"I do not understand why it is not," said the dentist. "Some of my fees are higher than those of other dentists hereabouts."

"What about your other fees?"

"I begin to question whether they are profitable. For instance, I get $15 per tooth for bridgework, but only $2.50 per tooth for treatments, and some of the treatments take longer than the bridgework."

"Then you must overcharge some of your patients in order that you may undercharge others," said the philosopher.

"I fear it comes to that in the end," admitted the dentist.

"You cannot demonstrate the application of ethics," said the philosopher, "because justice is one of the foundation stones of ethics, and no patient who knew that you were overcharging him for one kind of service in order that you might undercharge another patient for some other kind of service, would feel that he was receiving justice at your hands."

Ninth of a Series of Twelve Parables

How Much Is Enough?

Your "Success Questions" and your "Ethical Parables" are in my opinion wonderful eye-openers for dentists.

I know that such literature has been a fine incentive to me to increase my fees.

At the same time they are in a sense discouraging. For instance, the figures quoted in "Success Questions" No. 3 are to my mind not placed in the proper light.

Judging by the tone of this, the third question of your series, I judge that you think that $3,000 a year profit is not enough for a dentist in a community of 5,000 people. I myself think that he is receiving his fair share of the world's goods. I think he can care for his family, own his home, put his children through school, and be as well off as any of his neighbors.

My reasons for saying this are, that he is receiving as much money as the bank president (in that community) and more than the men with families who are employed in that bank, and he is receiving as much as the big majority of business men in that community. Indeed, I could take you from house to house in such a location and I will venture to say that we would not find three men in that place with better paying positions.

Of course there may be some who have larger incomes, the fruit of shrewd investments, which fruit can be picked by a dentist once he has sown the seed.

As for the protection of his family in case of his death, why can he not take out a $10,000 life insurance policy, the same as the rest of his neighbors, and give his family that kind of protection?

If your banker and storekeeper can put their children through school on $3,000 a year, why can't the dentist? If he can't there is something wrong with him.

Your articles convey the impression that dentists are of no account in any community, which is a false impression, proven so by your personal experiences and mine. Of course, a certain percentage are failures in dentistry, as in everything. This will always be so I presume.

I believe dentists like all "white collared" workers have felt the increased living costs of the last two years more than they should, because it was pretty hard to double and treble their prices and still do business.

But they were not the only ones who were caught, and the declining living costs mark a better era for them, because their prices are going to stay up about where they are now, I believe.

J. M.

Successful Dental Practice

By —— ——

According to THE DENTAL DIGEST you invite answers to Success Questions in the form of life stories. Although my life's story could not be completed at this time, because I'm not dead, I feel a keen interest in my profession and a profound sympathy for those who have spent much time and money preparing themselves for a life of usefulness to others and pleasure to themselves, only to go down the frequently-trodden path of failure to inevitable disappointment to themselves and sorrow to their loved ones.

However, it must be remembered that dentistry today offers one of the best fields for success of any of the professions, and because a percentage of practicing dentists are general failures does not destroy to any degree the usefulness of the entire chain. Each member of the profession is a complete unit within himself, and because somebody else fails is no reason why the whole profession should pause any more than all the building in the country should be brought to a standstill because some carpenter died.

True, the failure in dentistry is no credit to himself or the profession any more than any failure in any other line. True, also, that the dentist who is constantly in need of money—on the ragged edge, so to speak, is the victim of an influence which is liable to prompt him, in some cases, to sell the patient the wrong job because of the greater fee obtainable by so doing. This is a bad condition and should not exist.

To my way of thinking, a dental practice should be divided into three parts, namely, professional, business and social. The professional end carries with it the sincere execution of every duty a dentist owes any patient who reposes in him the confidence shown by visiting the office of said dentist.

First is diagnosis. Make it honestly. Determine by any available means the true conditions. After deciding regarding conditions, then determine what mechanical restoration will furnish the patient the best and safest service. Look at these things from all angles and finally reach your decision without permitting your mind to go for a single second to the subject of fees.

Now you are ready to tell the patient what should be done. In the meantime said patient has read the conspicuously placed notice, "Deposit required. All work is cash except other arrangements are made before work is started."

You are now ready to talk the business side of this proposition. You have been honest with your patient in your diagnosis and suggestion for restorations, so now do yourself the justice to treat yourself accordingly. If the patient contracts to have the work done, insist upon

a deposit. Take whatever is convenient to the patient, if it is at all reasonable. Do it in a nice way, of course.

Always be nice to your patients, and especially nice to old maids and ugly women. By "ugly" women I mean those that are so deucedly homely that they know it themselves. Most everyone passes this kind by, so when they receive especially nice treatment from a regular professional man you have no idea how deeply you settle yourself into the hearts of those individuals. They all fall for it and don't you forget it.

Well, I wandered from my subject, but not too far, I know, because being nice to people is a part of dentistry that might properly be placed under the head of the "business end of dentistry."

If work must be done on credit be sure to look up the standing of the prospective patient and find out whether or not he is a safe chance. The first time an instalment fails to come on time, send a notice. That patient is doing something with your money he has no business to be doing. Look him up. Keep the account hot until the last dollar is paid. You not only get your money but you retain the friendship of your patient.

I make one exception in the credit business—that of plate work. No plates are permitted to leave the office until *paid for in full.* I have learned by experience that the unpaid-for plates cannot be made to fit the case just right. Make your plates right to start with and stand behind them, but get the money for them when the patients take them away.

Now the social part of dentistry, as I see it, consists not in breaking yourself to go to church and landing a Sunday School superintendency, etc., etc. Of course, we should go to church and Sunday School and help support same because they are worthy institutions working for the benefit of all mankind. I believe it unnecessary to sling money right and left for the purpose of being a "good fellow." The fellows you spend it on just call you "Doc," and probably have their dental work done by somebody they can "stand-off."

However, it isn't advisable to be a "tight wad" either. Be conservative in all things. I believe the professional man should exercise modesty by staying in line with the masses rather than push himself forward so he can be the "biggest toad in the puddle." Be just an ordinary citizen, because immediately when a professional man accepts responsible positions he subjects himself to unavoidable criticism which can accomplish but one thing—losing prestige with some members of the laity.

In the foregoing I have briefly outlined my ideas which I have followed for several years, and today I feel I am a successful dentist, because I am giving my patients honest dealing, am collecting the money for it which amounts to enough to enable me to save some each month without depriving myself or dependents of life's necessities and some

of its pleasures. Also I am able to stand beside my fellowmen and sincerely feel that I too am a self-respecting, natural born citizen of the greatest country on the face of God's green earth.

The Agreement That Failed to Go Far Enough

By Elton J. Buckley, Philadelphia, Pa.

[Readers of THE DENTAL DIGEST are invited to submit questions of a legal nature to Elton J. Buckley, care of THE DENTAL DIGEST. This service is free.—EDITOR.]

In one of these articles written some time ago, I explained that the law allowed a man who was buying a going business to tie up the seller of it by an agreement not to re-engage in the same line of business in the same neighborhood for a certain period.

While such an agreement is in restraint of trade, which the law does not usually favor, it recognizes that unless the buyer of a business got some such protection, the seller might at once open a place next door and get all his old customers back. So the law upholds such agreements, where they go no further, either as to time or territory, than is necessary for the protection of the man who needs protection.

I have just witnessed the trial of a case which shows how careful should be the drawing of such agreements, else the protection which they furnish will be only partial.

In this case a man bought a retail business on a certain corner in the city of Philadelphia. It was an established business, and a very good location. Before buying, the prospective buyer took the precaution to go to an attorney and have him draw up a particularly elaborate agreement binding the seller not to engage in the same business within a radius of so many squares for a period of five years. (This period was unnecessarily long, and had the case turned on that the agreement would probably have been thrown out on that ground.)

The agreement bound the seller not to *personally* re-engage in the same business and that is where it fell short. One day only a few weeks after the buyer took possession, he was astounded to hear that Ward, his seller, was about to open the same sort of place in a building which he owned immediately opposite. He did not believe it, but the next week the place opened. It bore only the name of "Ward."

At once he employed an attorney, who filed an application for injunction, the ground being the violation of the agreement. At trial it was proven that Ward, the seller of the other business, was the owner of the building in which the new store had opened, that he had leased it to his twenty-one year old son, who was or had been employed in quite a different line of business and had had no experience in this line; that the son had opened up the new store and that the stock and

fixtures had been bought in the son's name. The father lived on the premises and had been seen working about the business.

The court said it personally believed that the whole scheme was a fraud to avoid the restrictive agreement, but it was powerless to grant the injunction because it had not been proven that the business was really the father's. So tenderly does the law protect a man's right to enter business, it said, that it will not take it from him except upon what amounted to clear proof.

Therefore, because of the absence of clear proof, and because Ward had merely covenanted not to *personally* re-engage in the same business, the buyer of Ward's business is compelled to see most of his customers going back to the Ward store.

Now there are a great many cases which have held that the seller of a business cannot make such a restrictive agreement and then get around it by engaging in business as an employe, or "manager," or something of the sort. But in all of those cases the former seller had been actually associated with the business in some way. In the case I describe the son had apparently done everything, and been everything, the father having merely been seen working once or twice about the place.

Now how could all this have been avoided? Very easily, by drawing the agreement a little differently. It will pay any reader hereof who may at any time buy a business, to cut this out and file it away for future reference, for it literally might be the means of saving him his business. The following paragraph in the agreement of sale would cover it:—

> And the said .....seller as aforesaid, for and in consideration of the within premises, hereby covenants not to re-engage in the same line of business within the said town of .....(or within a certain radius of squares) for the period of one year, either as owner, manager, partner, stockholder, agent, employe or adviser, or in any other connection whatsoever, direct or indirect; nor to permit or aid any member of his family, or any other person, if same can be avoided, to engage in said line of business within the said period and the said territory, if by same the said seller's name or identity would be associated in any manner with said business.

This would come as close as anything could to completely tying the hands of the seller so he could not undermine the business he had sold. In the case above described, it would have met the case fully, for it would have prevented the father from leasing his property to his son, or advising him about the business, which of course he did.

The Dentist at the Age of Forty-five

By George Wood Clapp, D.D.S., N. Y. City

BY the age of forty-five the dentist should have accumulated at least half of the surplus upon which he is to live after the age of sixty-five, and should have it invested in income-producing securities which would be approved by a conservative banker. All stock holdings upon which returns of from 15 to 50 per cent annually are promised should be ruled out. They will undoubtedly net the chap who sold them good returns; their value to the dentist is questionable.

If the dentist forty-five years of age has not the courage to face the future and to subject himself to rigorous control for the remainder of his working life, he might just as well go on as he is. But he should do it with his eyes open and with the knowledge that unless he is lucky enough to die before the age of seventy, he is likely to face straitened conditions after the age of sixty-five or to be dependent upon someone else for his necessities and comforts.

At the age of forty-five, half of the average dentist's great earning period is passed. He will do well if he can average one thousand income hours for each of the ten years just ahead of him. He will soon be wearing bi-focal lenses, indicating the progressive change in vision; he may tire more easily; he may have less ambition; he may more easily fall prey to slight or serious illness.

If the dentist who arrives at the age of forty-five without a financial surplus is to accumulate that surplus, he must make the most of every income hour remaining to him. He must do in ten years what he should have done in twenty. He will need all his intelligence, his energy and his moral courage to accomplish it.

He has one great resource which should be immediately called upon for its contribution. He should have a pretty thorough knowledge of the fundamentals in dentistry and of how to handle patients. He should know some of the simpler rules of office conduct. The fact that he has acquired no surplus, unless he has had extraordinary, unavoidable expenses, indicates that his knowledge is mostly professional and only in small part a knowledge of good business administration.

Such a dentist should be well grounded to master a specialty in which he can sell his accumulated knowledge at greater financial profit to himself than he could in general practice, provided he is so located as to permit specializing or can so locate. If he is to specialize, he owes it to his profession, his patients and himself, to fit himself by special courses to render the best services of which he can be made capable.

Such specializing, if rightly conducted by a person with pleasing address and of adequate skill, is often very profitable. Without going into the realm of the extraordinary successes, dentists may be found who are earning from $12,000 to $20,000 net, annually. Of course such earnings can be found in general practice, but they are rare.

The dentist at forty-five should learn to employ, train and retain assistants who will do all the work except that for which his professional experience and knowledge are essential. Let him remember that he is trying to make up for lost time.

The dentist at forty-five must devote himself with diligence to the mastery of good management of all the business details of the office, or employ someone capable of so managing. He must have an exact knowledge of costs of all service, which, in his case, should be carried out in great detail, to avoid the small leaks which a younger man might overlook.

He must make himself a skilled salesman of service at fees which exceed by a considerable margin the total cost of that service, because he must place in his old-age-surplus-fund twice as much annually as the dentist of thirty-five years of age.

He will find ample exercise for his moral courage in resisting the temptation to break into this surplus or to yield to seductive arguments to invest some of it in enterprises offering huge returns. That courage must be exercised also in living modestly when he is handling considerable sums of money and knows that he has a surplus. It is much harder to live within the income when one has ten thousand dollars a year than when one has twenty-five hundred, because the power of temptation increases with every increase in the earnings. Remember that there is more total comfort in driving a flivver all through life than there is in driving a Pierce-Arrow for five years and walking thereafter.

The dentist at forty-five should exercise the utmost care to balance his office work by enough well selected physical exercise to keep his body sound. Professional work is so largely mental and indoors that the heart, lungs, kidneys, etc., are starved unless care is taken to exercise them. For the dentist in middle life, long office hours are contraindicated. To add evening work to a long day is, for him, exactly the wrong road to real accomplishment.

Any man with fair physical capital and decent habits, can extend both his working period and his life beyond the average. No dentist at forty-five need feel that a surplus for old age support is unattainable by him if he will do what is necessary. But if he has reached forty-five without accumulating any considerable part of it, he should realize that continuance in his present form of management will find him old and without money, and that he must bestir himself immediately and diligently.

Few things worth having are easily won. Certainly a competence is not. It awaits him who can take it. It offers itself to none and never compromises as to terms.

The dentist at forty-five might paraphrase Longfellow as follows:

Let me then be up and doing,
I'll be master of my fate:
And good management pursuing,
Win a competence ere too late.

The Advertising You Are Doing

By Harry Botsford, Titusville, Pa.

I can visualize the average dentist when he reads the caption to this article. He will probably bristle up, snort disdainfully and remark: "Darned fool! Doesn't that writer know that this matter of advertising is one that dentists don't like to discuss? Some of us declare it's unethical and others are for it. 'The advertising *you* are doing' indeed! Why I'm not doing any advertising!" And so on, and so on.

But all the same, Mr. Dentist-Reader, you do advertise! You don't? That is, you mean that you do not make a practice of newspaper advertising, cut rates and circulars and personal letters. Perhaps you don't use these methods of advertising, but all the same I still stick to my original statement, that *you do* advertise.

Webster, unanswerable authority, gives us a definition of advertising in which there is no mention of newspaper advertising, circulars or letters. Advertising—according to this authority—is "giving publicity to one's business."

As a dentist, how do you gain publicity? By a multitude of ways. Whether or not the publicity is favorable, depends upon a multitude of things.

How about the nurse-assistant? Is she a good advertisement for your office or not? Does she give the patient the feeling that herself or her patronage is appreciated, and does she render the degree of service equitable with high professional services? Is her dress neat, orderly and not over-loud? Does she smell to high heaven with the stench of cheap perfume, and does she agree with a patient's opinion with an "I'll say so!" or an "I'll tell the world you're right!"

Is she guilty, or is one of your assistants guilty of one infraction on the above matters? If so, it's poor advertising. Mighty poor! It will give your office unpleasant publicity that will be bound to keep desirable and refined patronage away. Either fire or educate the offender. Don't advertise that way!

As the owner of the offices, you do considerable advertising on your own hook. Many times it isn't very good advertising either! Don't

knock your competitor, for if you do you are only giving him publicity and your clients are very liable to form the opinion that you are afraid of the competitor and will swallow your statements with a grain of salt, and are very liable to go and see him to find out if you were not mistaken.

Do your clients ever come into your private office? If so, what do they find? A neat, well-arranged office, orderly in every respect and with a few comfortable chairs in which they can be seated? Or do they find, what is too often the case—floor that needs sweeping, and uncomfortable chairs covered with a layer of dust that looks as though it had been there since Cleveland was president? Is the desk littered with mail, and is the table cluttered with unopened trade journals? There is no better sign that a man is not abreast with the times than an unopened trade journal!

How about the monthly statements you send out? Remember, please, that these bills are sent your most valuable clients—you are not granting credit in an indiscriminate manner. Aside from the fact that the monthly statement is a reminder of a balance due, they should carry another message. To carry this other message that will build prestige and respect, the monthly statement should be plainly written on a neatly printed and well-balanced billhead of excellent quality of paper. Good advertising? The best in the world! Helps create and hold favorable opinion.

I really can't see any definite reason for enumerating a multitude of items; it seems to me that I have proven my case; the dentist, whether he knows it or not, does advertise.

Public opinion, Mr. Dentist-Reader, is the greatest thing in the world. Nations stand or fall on it; issues live and die on public opinion, and the dentist must regard public opinion as the inexorable quantity that governs eventual profits—the thing which every dentist is striving for with all the skill and energy at his command.

You cannot ignore public opinion and you must work and work eternally to create it. Your every act is sized up and measured by the rigid standard of publicity.

Mr. Dentist-Reader, you've got to watch your step! All of your advertising isn't confined to newspapers. Your clients—trite but true expression—are your advertisements. If they are satisfied with your skill, your offices, your assistants, your service and your personality, they are going to tell their neighbors that you are a good dentist to see. In other words, your clients do about 90 per cent of creating public opinion. *You* don't. But *you do* have to influence the mind of the client by your own keen desire to serve, and to serve well, and not be actuated by anxiety to "put something over."

Once the client is convinced, favorable publicity is yours. Hang on to it! It's worth money! Don't lose it! Go after more of it!

Income Tax Suggestions

In making up your income tax returns it might be well to insure the inclusion of some of the following items which are all legitimate expenses against your practice and should be entered in the overhead.

Subscription prices for professional magazines as well as for magazines for your reception room table.

Expenses for post-graduate courses, study club expenses, attendance on dental conventions, all of which are educational, and enable you to render better service to your patients.

You should charge uncollectible accounts, charity accounts, 10 per cent depreciation on equipment, 5 per cent on refunding account, which is designed to refund the amount of your original investment in twenty years, as well as such other expenses connected with the actual conduct of your practice, and which may be peculiar to only a few practices.

We have not mentioned the obvious expenses, such as supplies, office attendants, heat, light, rent, etc., because charges of that nature will nearly always be deducted.

Every one should prepare an income tax return carefully from actual records so that in case of any question arising you can refer instantly to the basis for your return.

Income Tax Information for Dentists

By Mark Graves

Director New York State Income Tax Bureau

The old-time cordial salutation of members of the dental profession at their conventions and business reunions—"Isn't it nice to think we can meet like this?" takes on added pleasure with the decision of the New York State Income Tax Bureau not to change the ruling that actual expenses of the dentists at a convention are current business expenses and deductible in making out income tax returns.

The view was taken by certain tax experts that attending such conventions was a capital expenditure the same as a college or post-graduate course, or a special course of any kind, to increase income-producing power and no deduction for expenses could, therefore, be made. Officials of the State Income Tax Bureau continue to hold, however, that the convention advantages, like the benefit derived by a dentist from subscribing to dental journals, enable him to keep abreast of his profession and are a necessary expense. Otherwise he might fail to maintain his proper relative standing in his profession.

Although it was a hard pull for many dentists, on account of the wiping out of their practice through service in the army and navy during the war, returns on file with the Bureau indicate that members of

the profession did remarkably well in paying their share of the income tax total for 1919 of $36,500,000.

An experience of twelve months in the administering of the State Income Tax Law developed the necessity for some changes in the law. Great confusion, for instance, was caused by the fact that the filing date for paying both the federal and state tax was March 15th. The law was amended so that returns for 1920 might be filed any time between January 1, 1921, and April 15, 1921. This gave 30 additional days in which to file state returns—a breathing spell greatly appreciated by the majority of the eight hundred thousand persons who filed returns.

Dentists will be interested in knowing that they may now deduct from their gross income all interest on indebtedness paid or accrued during the year. They may also make deductions for supplies and drugs actually used in the practice of their profession. Dues to dental societies or a chamber of commerce or a board of trade are deductible items, and contributions or gifts made to religious, charitable or educational corporations or associations regardless of whether they are incorporated or organized under the laws of the State of New York, are also deductible. The amount of such deductions is limited, however, to a figure not greater than 15 per cent of the dentist's net income.

Amounts expended for books, furniture, professional instruments or equipment of a permanent character are not allowable deductions, but a proper allowance for depreciation may be made. While on this subject, attention is called to the fact that most of the inquiries made of the Bureau relate to allowance for depreciation in the value of instruments used solely in dentistry work. A reasonable deduction may be made each year for depreciation in value of, for instance, dental chairs, X-ray machines and other instruments. A dentist may also make deductions on account of certain instruments becoming useless through replacement with new and more modern instruments. There are many cases where a dentist combines a residence and office. In such cases a deduction may be taken in respect of that proportion of cost of repairs on this real estate which the space occupied for offices bears to the entire residence. In case the house is rented by the dentist he may deduct the proportion of rent paid computed in the same manner as here outlined with reference to repairs.

The Bureau is receiving a large number of inquiries as to whether payments of interest received from investments in Liberty Bonds should be included in income. The law provides that such interest payments constitute non-taxable income. Any accounts on the books of a dentist which he has included as income, and which he determines during the calendar year to be bad debts, may be charged off and deducted from his gross income earned during the same calendar year.

The Bureau has a complete list of all dentists who paid an income

tax to the State for the year 1919, and these dentists will receive a blank form in duplicate for the filing of their return of income for the year 1920. The failure to receive a form does not, however, exempt a person from making a return. Dentists filing a return for the first time can obtain form 201 (not 200) at the nearest State Income Tax District Office.

Exemptions are $1000 for single persons and $2000 for married persons and heads of families, plus $200 for each dependent under 18 year of age or incapable of self-support. The only change in exemptions has to do with the filing of separate returns by a man and wife. In such cases the exemption must be claimed equally; that is, the dentist cannot claim three-quarters of the exemption and his wife claim the remaining one-quarter.

Forms can be obtained and the tax paid at any of the following District Offices:

Albany, New York, Brooklyn, Rochester, Buffalo, Elmira, Binghamton, Kingston, Utica, Syracuse, White Plains, Jamaica and the Bronx.

PRACTICAL HINTS

This department is in charge of Dr. V. C. Smedley, 604 California Bldg., Denver, Colo. To avoid unnecessary delay, Hints, Questions and Answers should be sent direct to him.

Removing Stains.—To remove silver nitrate stains from oilcloth, linoleum, hands and clothing: First paint the stain with iodine and then follow up with concentrated ammonia.

To Save Time in Using Sandpaper Disks.—Procure an extra point of the same type for your push mandrel and have assistant put a new disk on the extra point while you are using the other. Remove the worn disk with a quick jerk without stopping the engine and insert the new one in the same manner while the engine is still running.

Dr. Max Giesecke.

Editor Practical Hints:

Can you tell me how I can remove iodine stains from a silk and rubber dental apron, without affecting the rubber? I have tried ammonia but in vain.—Dr. C. H. Farrand.

Answer.—Strong ammonia will remove fresh iodine stains. In this case, try washing in sodium hypo-sulphide solution. While I have never used this, my druggist gives it as the correct procedure.—V. C. S.

Editor Practical Hints:

I have a very interesting case in hand and would appreciate some comment on same. Patient, male, 59 years old, a fruit grower by occupation and in perfect health; gums and other oral conditions normal. All teeth crowned both upper and lower; has had two sets of crowns, and the present ones have been on eighteen months. These crowns, both upper and lower, are completely worn out all the way around and were reinforced with clasp gold on the occlusal surface.

As gold will wear smooth in most cases where too much pressure is brought to bear on it, I am at a loss to account for the conditions causing these crowns to be worn very rough and pitted on the wearing surface. If you can give me any information concerning this case I will greatly appreciate it.—Dr. F. M. F.

ANSWER.—Think your man is chewing something with a lot of coarse grit in it. Have heard of similar conditions through the use of some brands of chewing tobacco. Have seen pure gold surfaces thus pitted from chewing Zweibach or hard toast. Carpenters will frequently hold shingle nails in their mouths and chew on them as they work.—V. C. S.

Editor Practical Hints:

What can be done with very sensitive necks of teeth where the gum has receded exposing the cementum?—J. E., Brooklyn.

ANSWER.—Try ten per cent Formalin solution painted upon dried surface and burnish with hot burnisher. Burnishing with concentrated solution of silver nitrate in this same way will usually desensitize these surfaces. If, however, you do not get results from either of these methods, paint the surface with Buckley's desensitizing paste and cover with a temporary cement, allowing same to overlap gum and fill interproximal spaces for retention and remain on for two or three hours.

V. C. S.

Editor Practical Hints:

Will you kindly advise to what extent a dentist holding a license in the State of Washington, and the degree of Doctor of Dental Medicine, has a right to practise Oral Surgery?

ANSWER.—My understanding is that a dentist is entitled to practise oral surgery whenever the teeth and alveolar process are concerned. Antrum cases coming under his jurisdiction, where they are connected with teeth root conditions. He is not, however, within his correct sphere if he attempts tonsillectomy or nasal operations without the M.D. degree.—V. C. S.

Editor Practical Hints:

What can be done to avoid vomiting during upper plaster denture impression?—B. L.

ANSWER.—Place a dam of bees-wax across the heel of your impression tray to confine the plaster, spray the throat with camphor water or with two per cent solution cocaine or novocain, or in most severe cases where the spray will not suffice give the nerve block injection.—V. C. S.

Editor Practical Hints:

Will you please tell me what Trench Mouth is, how it affects the gums, and how to treat it?—S. E. COOPER.

ANSWER.—Trench Mouth or Vincent's Angina attacks the gums as a very rapid progressive ulcerative gingivitis, often resulting in much pain, loosening and loss of teeth in a remarkably short time if unchecked by treatment. The most effective treatment, I believe, is that given by Dr. T. J. Gallaher, nose and throat specialist of Denver. This consists of protecting the cheeks and tongue with cotton rolls, drying the affected tissue, painting with saturated solution of trichloracetic acid, allowing this to remain on a few minutes and then neutralizing with soda solution. Often one, two or three such treatments will effect a complete cure.

Dr. M. Giesecke has charge of this work in our office and he prefers to supplement the above treatment by having the patient rinse the mouth after each meal with fifty per cent dioxogen solution and paint the ulcerative surfaces with five per cent chromic acid with cotton on a tooth-pick. The bacteria of Vincent's disease are anaerobic and the free oxygen of the dioxogen is very deleterious to their growth.—V. C. S.

Editor Practical Hints:

What could I use to get an upper cuspid out in line that now bites inside of lower teeth when they close in occlusion? Patient age fifteen years.—F. S. WALKER.

ANSWER.—Single upper teeth in lingual occlusion for younger patients can be brought to normal position by making a little rubber splint to be cemented on to the lower incisors with an inclined plane extending upward and lingually to engage the point of the cuspid which may be beveled a little by grinding with a stone lingually. This places the entire force of the jaw in closing upon this one tooth, with the inclined plane directing it forward. As soon as the point of the cusp is brought labially far enough to extend over the lower incisors, the rubber splint may be discarded. This works better with laterals and centrals and with younger patients, but you might try it in this case. It is quick and simple when it is applicable to the case. As a rule, however, I think it best to refer all regulating cases to an Orthodontist.—V. C. S.

Editor Practical Hints:

Will you kindly inform me what year casting by suction was discovered? Which was first, the clay pipe method, or the machine?

Any information on the subject will be greatly appreciated.

V. WILKINSON.

ANSWER.—I cannot give you a definite answer to your questions, but perhaps some other reader can. Dr. Taggart first demonstrated his method of casting during the winter of 1906 and 1907. Immediately thereafter a myriad of different casting methods and machines were

used by the various experimenters all over the country, and the methods you inquire about were probably first tried about that time.—V. C. S.

Editor Practical Hints:

I have a case of an upper denture which seems to fit and give satisfaction in every respect with the exception of the patient having to swallow all the time. This plate was made in 1918. At first I thought it was nervousness and she would get over it, but that does not seem to be the case.

One dentist she consulted recommended a metal plate as the means of correcting it, but I can not see the advantage and would like your advice.—H. W. Lane.

Answer.—Locate the posterior palatine foramenae toward the median line from the condyles and an eighth of an inch or so from the posterior border of the hard palate; relieve this area freely with a bur and see if this sensation is not relieved; it may be due to pressure on the nerve trunk as it leaves the foramenae.—V. C. S.

CORRESPONDENCE

Editor DENTAL DIGEST:

In the DENTAL DIGEST for December I read an article by Dr. Geo. S. Weger of Denver, Col., "Teeth, Tonsils and Toxemia," with much interest, and is to be commended.

It breaks holes in the mud hut of ignorance, and lets in the white light of truth, and the refreshing breeze of knowledge.

This article should be read by every physician and dentist, as it will help to inject a little horse sense in both professions. Truth like this makes us think, and surely will make us more careful in diagnosis.

The wholesale extraction of teeth as recommended by some practitioners should and must stop. A patient of mine has just returned from a sanitarium, where he was advised to have his teeth extracted. I examined his mouth carefully, and found it in an excellent condition, with but one exception, a devitalized molar which can be saved.

I think this army of extremists should call a halt, if we are to benefit humanity and stop making them pay for our mistakes.

W. B. L.

Editor DENTAL DIGEST:

Occasionally for years I have done immediate plate work after extraction, and as there is some talk about it in the magazines I would say that I consider it a very useful method. I have been very successful, but of course there is nothing new about it. I presume our forefathers did it before we were born, and as it has rather fallen out of sight it cannot have proved itself to be the best method.

I recently did a very satisfactory case both to my patient and myself. I took a careful plaster impression—11 teeth in place (pyorrhea and gingivitis), sent the model to the manufacturers, who returned me the identical tooth in teeth shaded in the set. I cut the teeth off the model one by one and set the porcelain ones in their identical places regardless of occlusion; and by the way, if you do this you will learn something about natural occlusion as differing from theoretical occlusion. Finally calling the patient up and extracting all the teeth under novocain and putting the prepared plate in immediately, it went to place with little trouble as they usually do, and the patient went away with them in place, being toothless only about 20 minutes or until the bleeding stopped.

To surprise her husband she told him she lost her courage, and to prove it showed her teeth. He knew what was going to happen but the

artificial ones made so close an approach to the others that he was completely dumbfounded.

Of course the gums were sore, but I believe they were not so sore covered up and protected by a plate as they were uncovered and open; and the patients say that of course their mouth feels bad, but it feels worse with their teeth out than with them in.

But there are no telltale old folks' wrinkles produced by the falling in of the lips. Also the dentist has a definite bite to go by, which is a great help. It is only in few plates that we really put teeth where the mandible has no "accommodating" to do, and those happen to be the ones where the patient says they felt good from the start.

I expect sooner or later I will have a rude awakening, but so far I have had a great deal of satisfaction from such work.

By the way, I capped a nerve in 1912, large exposure in molar, using a good cement only (phenol to sterilize cavity). Two years ago I had to replace the filling and lifted off capping; in so doing I found nerve still alive. Later on I drilled for another cavity in same tooth on other side, and it was still vital and normally sensitive, and the exposure was a good large one.

I do not know whether this will be of interest or not, but thought I would tell my experience anyway.

F. A. Graham.

Editor Dental Digest:

The following letter was received by me quite recently, and it only shows what a professional man is liable to encounter from time to time in his day's work.

C. S. H.

Dear Sir:—Received your bill for $4.00 for services rendered to Mrs. McNulty. Mrs. McNulty went to you to have a tooth pulled, and you sent her to another dentist and he charged $5.00 for pulling one tooth and now you want $4.00 for not pulling it. Do you want to be paid for something you were unable to do? You sure have some gall. You don't need to take Peruna, your nerve is O. K.

Yours truly,
C. McNulty.

Editor Dental Digest:

I would not be the one to discourage the charitable proclivities of Dr. M. Mortensen, of Moline, Ill., who, in the December Digest advocates free dental service to children under twelve. Curiosity, however, prompts me to inquire why those well able to pay are included in the charity class and those unable to pay excluded unless their age is under twelve.

I believe Dr. Mortensen must have given considerable thought to this subject, and it would only be fair to the doctor and interesting to us if additional space in a future issue could be granted him so he might tell us why he thinks children are entitled to free service, and if, in his program of humanitarianism, he has not included other necessities in the free list.

My experience with dentists has taught me that they are a reasonable lot of men and women, and once they are convinced the children are entitled to be served without charge there will be no necessity to make the service compulsory.

CHARLES WOLFF, D.D.S.

French-Belgian Relief Fund

A final report of the French-Belgian Relief Fund of the Preparedness League of American Dentists is appended.

A Commission of Paris dentists, namely, Doctors Wm. Slocum Davenport, Georges Villian and Richard Burkhardt was appointed to act with La Aide Confraternelle in the distribution of the funds. Because of the foreign exchange, the amount was materially increased. The Preparedness League appreciates the generous response, and takes this opportunity to thank those who gave assistance. Contributions received are as follows:

Connecticut State Dental Society	$500.00	Dr. L. Meisburger	$ 5.00
Connecticut (Balance of Ambulance Fund)	33.47	Dr. C. I. Harrison	2.00
Dr. A. W. Crosby	25.00	Empire Trust Company (Interest on bank balance)	18.75
Dr. Donald McCasky	1.00	Dr. Geilfuss	100.00
Dr. J. W. Beach	100.00	Milwaukee Odontological Society	25.00
Dr. W. D. Tracy	500.00	Dr. J. P. Buckley	5.00
Rochester Unit Preparedness League Study Club	11.00	Dr. A. I. Hadley	10.00
Dr. W. P. Felch	10.00	Dr. F. T. Murlless, Jr.	25.00
Indiana State Dental Association	100.00	Dr. G. W. Harbour	2.00
Dr. J. R. Hasbrouck	5.00	Dr. G. M. Somers	10.00
Dr. W. A. Spring	25.00	Dr. G. A. Freeman	1.00
New York State Dental Society	500.00	Dr. Henri Letord	5.00
New Hampshire Dental Society	300.00	Fidelity & Casualty Co. (return premium on bond)	7.30
Empire Trust Co. (Interest on bank balance)	2.37	Michigan State Dental Society	100.00
South Dakota State Dental Society	50.00	South Carolina State Dental Society	78.50
Georgia State Dental Society	130.00	Pennsylvania State Dental Society	500.00
Dr. Hector G. Marlatt	5.00	Northern Ohio Dental Assn.	50.00
Miss Mary Daly	1.00		
Warren County, Pa. Dental Association	10.00		$3,253.29

J. W. BEACH, *President.*

"Wireless" Invented by a Dentist

A DENTIST living in Washington, D. C., invented, patented, and demonstrated wireless telegraphy before Marconi was born. Had it not been for the attitude of big newspapers, and the stubbornness and lack of vision of Congress, this country today would be enjoying the honor, distinction and credit of presenting wireless telegraphy to the world, according to H. O. Bishop in *The Dearborn Independent.*

The name of this comparatively unknown inventive genius is Mahlon Loomis.

Back in the sixties and seventies he eked out a modest living by plugging the defective molars and making "store" teeth for the politicians and social leaders of Washington.

Dr. Loomis called his discovery "aerial telegraphy." His first public demonstration was made in 1866 from the two peaks of the Blue Ridge Mountains in Virginia, some eighteen miles apart. From each peak an ordinary kite was elevated, connected with an insulated copper wire attached at the lower end to a telegraphing apparatus. The operators of each party were provided with telescopes, with which they could sight from one station to the other and read the signals. When all was in readiness, a message was sent by the doctor along the wire of his kite, and was received at the station on the other mountain top just as though the two kites had been connected with a wire in the ordinary way. In this manner communications were kept up until the fact was thoroughly demonstrated that telegraphing could be done as readily without as with connecting wires.

Shortly thereafter Dr. Loomis made a successful experiment in communicating between vessels. This demonstration took place on Chesapeake Bay. The vessels were stationed about two miles apart. On each vessel was a telegraphic apparatus. A wire was attached to the instrument and one end thrown into the water at a moderate depth. Another insulated wire of much greater length was let down to a greater depth into a colder stratum of water. The two strata of water of different temperatures thus connected to the same battery made a complete circuit and enabled communications to pass between the two vessels without other connections. The experiment was a success. On the same principle he expressed the belief that the warm current of the Gulf Stream, if similarly connected with the adjacent cold water, would afford a means of telegraphing a great distance—perhaps as far as a decided difference in temperature is maintained. At this time Dr. Loomis also discussed with his friends the ease with which he believed it would be possible to telegraph to or from a train going at a high rate of speed.

Thoroughly to appreciate the early discoveries and successful demonstrations of Dr. Loomis it should be borne in mind that it was not until June, 1897, thirty-one years after his successful telegraphing without wires between the Virginia mountains, that Marconi, in England, sent his first wireless message a distance of nine miles.

Subjected to ridicule, Dr. Loomis was constantly pursued by the shadow of bad luck. For instance, in 1869 he had succeeded in prevailing upon a number of Boston capitalists to promise to advance the necessary money to establish his discovery on a commercial basis, when along came that never-to-be-forgotten "Black Friday" in Wall Street, which proved to be the most serious financial panic in the history of the country. His backers lost every dime they possessed.

Still undaunted, this patient and cheerful man came hustling back to his dental office on Pennsylvania avenue to extract molars until he had sufficient money to go to Chicago in 1871, where he talked his invention with such success that moneyed men agreed to finance him. But again ill luck crossed his path. The contented smile of a long-deferred success was yet fresh on his features when that perverse cow of Mrs. O'Leary's kicked over the kerosene lamp, resulting in the great fire which reduced Chicago to ashes and his backers to poverty.

In addition to endeavoring to obtain financial backing from Boston and Chicago, Dr. Loomis made constant appeals to Congress for assistance in making it possible for America to be the first country in the world to establish telegraphy without wires. He worked with that body of legislators from 1869 to 1873, when they passed a bill incorporating the "Loomis Aerial Telegraph Company," which was signed by President Grant. Congress, however, overlooked the little matter of appropriating the $50,000 asked for and naturally the corporation never got anywhere without funds.

Senator Sumner, of Massachusetts, introduced the first bill for Loomis in January, 1869. The Senator straddled the proposition and passed the buck to his colleagues in this brief speech: "I present the petition of Mahlon Loomis, D.D.S., of the District of Columbia, who believes that he has invented a new mode of telegraphing, which he submits as a great and valuable improvement upon any former mode known or discovered. He briefly says: 'The nature of the discovery or invention in general terms consists in establishing an electric current or circuit for telegraphing without the aid of wires or cables to form such electric currents and circuits. As in dispensing with the double wire (which was at first used) and using but one, allowing and relying upon the earth to form one-half of the circuit, so now I propose to dispense with both wires and all artificial batteries, using the earth for the other part of the circuit.'

"After setting forth at some length his invention of his theory, he asks Congress for an appropriation of $50,000 under such restrictions

as Congress may impose, to enable him during the next year to complete the demonstration. In presenting this petition I desire to say that I perform a duty, and I content myself with remarking that it is either a great case of moonshine or it marks a great epoch in the progress of invention. I do not undertake to express an opinion upon it. I ask the reference of the petition to the committee on patents."

On the night of May 21, 1872, the House took a whack at the bill in quite interesting fashion. The bill had been introduced by John A. Bingham, of Ohio. It was reported that night by Omar D. Conger, of Michigan, chairman of the committee on commerce. In making his report Mr. Conger took an oratorical flight, as follows:

"This theory assumes that the earth itself, the atmosphere surrounding it, and the infinite depth of space encompassing this aerial world, contain a succession of concentric circles or planes of electricity, of which those nearest the earth are perpetually disturbed by oceanic currents, atmospheric changes, alterations of day and night, and the ever-varying effects of solar radiation and lunar influences; but that above these, pierced, perhaps, by the tops of the loftiest mountains, are concentric circles, or vast surrounding seas of undisturbed electricity, which may be affected by any interpenetrating galvanic force from beneath, causing electrical vibrations or waves to pass from that point within such electrical plane around the world, as upon the surface of some quiet lake one wave circlet follows another from the point of disturbance to the remotest shores. So that from any other mountain top upon the globe any conductor which shall pierce this plane and receive the impression of such vibration may be connected with an indicator, which will mark the length and duration of such vibration, and indicate by any agreed system of notation convertible into human language the messages of the operator at the point of first disturbance; and thus, not only from one, but many mountain tops, piercing far above the circumambient atmosphere, the devotee of science and the solemn student of nature may gather the unwritten messages of interest or affection from the silent solitudes of nature and the cerulean depth of heaven with unerring accuracy, and transmit them to the denizens of all lands by the mundane machinery of telegraphic instrumentalities.

"I understand that the highest authorities on electricity both in America and Europe sustain the theory upon which this project is based, to wit: That the earth is negatively electric, and that the atmosphere above the earth is positively electric, increasing in proportion as you ascend above the level of tidewater. The project here proposed is simply to connect the air at a certain altitude (three or four miles, if you please, above the level of the sea) with the tidewater level of the earth by means of wires, thereby completing the electric current."

During the course of his remarks Representative Bingham said: "The only way to know whether what is here proposed is practicable,

either for purpose of telegraphy or for the purposes of utilizing electricity for light or heat or motion, is to try it; and there is no way to try it, I apprehend, without some considerable use of capital. I pray the House to consider it favorably and allow it to pass. If no good comes of it there can be no harm, and favorable action by the House of Representatives on the bill will signify to the world that the House is disposed to consider, and not treat with derision and scorn, every endeavor to better in some sort the condition of individual and collective man."

On July 30, 1872, Dr. Loomis was granted a patent covering his invention, the specifications being as follows: "Be it known that I, Mahlon Loomis, dentist, of Washington, District of Columbia, have invented or discovered a new and improved mode of telegraphing and of generating light, heat and motive power; and I do hereby declare that the following is a brief description thereof:

"The nature of my invention or discovery consists, in general terms, of utilizing natural electricity and establishing an electrical current or circuit for telegraphic and other purposes without the aid of wires, artificial batteries, or cables to form such electrical circuit, and yet communicate from one continent of the globe to another.

"I deem it expedient to use an insulated wire or conductor as forming a part of the local apparatus, and for conducting the electricity down to the foot of the mountain, or as far away as may be convenient for a telegraph office, or to utilize it for other purposes.

"I do not claim any new keyboard, nor any new alphabet or signals; I do not claim any new register or recording instrument; but, what I claim as my invention or discovery, and desire to secure by letters patent, is the utilization of natural electricity from elevated points by connecting the opposite polarity of the celestial and terrestrial bodies of electricity at different points by suitable conductors, and, for telegraphic purposes, relying upon the disturbance produced in the two electro-opposite bodies (of the earth and atmosphere) by an interruption of the continuity of one of the conductors from the electrical body being indicated upon its opposite or corresponding terminus, and thus producing a circuit or communication between the two without an artificial battery or the further use of wires or cables to connect the co-operating stations."

It's Up to You

The foundation of content must spring up in a man's own mind; and he who has so little knowledge of human nature as to seek happiness by changing anything but his own disposition, will waste his life in fruitless efforts, and multiply the griefs which he purposes to remove.

EXTRACTIONS

Science is justice with her eyes unbandaged.

It's usually the man who has something to say who doesn't say it.

Any woman can make a dollar go so far that her husband will never see it again.

This is tact: In arranging for your guests at dinner, put the sweethearts together and separate the married folks.

"What do you think of the Irish question?"
"Are you asking merely out of curiosity or are you trying to start something?"

A mere layman can't understand why efficiency experts don't get into business for themselves and monopolize the world.

(George)—That horse knows as much as I do.
(Clara)—Well, don't tell anybody. You might want to sell him some day.

Tommy Fisher and his wife
Resolved to lead a better life;
Tommy wants her skirts cut lower,
But then, she says, he wouldn't know her.

An East India station-master had been cautioned to do nothing without instructions. That probably accounted for his sending the following message:
"Superintendent's Office, Calcutta.
"Tiger on platform eating conductor. Please wire instructions."

"Have I any chance to rise in this position?" asked a young man of his prospective boss.
"Yes, I think you have," answered the boss, "for I want you to open up the office every morning at six o'clock."

The Seattle Chamber of Commerce is in receipt of a letter from an enterprising Japanese who wishes to purchase brewing machinery of American brewery owners. He states that "breweries of this country must be totally wounded by the law of temperance."

(Smith)—I'll take my pictures now if they are done.
(Photographer)—Yes, sir, they're finished, but we do not deliver pictures until they are paid for.
(Smith)—Why, you told me I could pay for them any old time.
(Photographer)—Yes; but that was merely to make you look pleasant.

Until we are built like angels,
With hammer and chisel and pen,
We will fight for ourselves and a woman,
For ever and ever. Amen.

Self importance is only a "state of mind" with most people. We know a man who, after an absence of four years, went back to visit his old home town. The first four people he met didn't remember him, and the next three didn't know he had been away.

"This portion is very small," growled the man at a restaurant table. "As a regular customer here I generally have two pieces of beef, but tonight you have only brought me one."
"Gee, mister, you're right," said the waiter. "The fool cook forgot to cut it in two."

A local preacher once drove in a cab to the village church to preach. Upon his arrival he was somewhat disappointed to find that the congregation consisted of only one man. Remembering, however, that a well known minister had on one occasion preached to one man and converted him, he decided to give him the benefit of his discourse.
At the close of a long sermon he shook hands with his congregation, and asked him if his sermon was too long.
"Oh, it makes no difference to me," was the reply. "I am your cabman."

A young Californian often visited a leading Santa Barbara hotel because of its excellent honey.
When the young man got married the wedding trip included this hotel, so that the bride might taste this ambrosial spread.
But the first morning there was no honey on the breakfast table. The bridgegroom frowned. He called the old, familiar waiter.
"Where's my honey?" he demanded.
The waiter hesitated, looked awkwardly at the bride, then he stammered: "Er—Mamie don't work here no more, sir."

When Miss Ada Oakes of Washington, N. C., became a bride, it proved to be an unusual affair. A "wooden wedding" was planned so that everybody who took a leading part in the ceremony had a name like a tree. For instance, the groom was Walter Pine; the bride, Miss Ada Oakes; the best man, Robt. L. Birch; the bridesmaid, Anna Lee Laurel; the preacher, Rev. O. T. Wood. To make the "wooden flavor" complete the couple went to Hickory, N. C., to spend a week with the bridegroom's aunt, Mrs. E. W. Shingle.

DIETETICS and HEALTH

Food Adulteration*

Cost of Adulteration

It might be said that the prevention of food adulteration is more for the purpose of protecting the pocketbook than for protecting the health. The fraud practiced in food adulteration may sometimes be harmless but, if the adulteration reduces the nutritive quality of a food and adds some poisonous or infected substance, the culprit who practices food adulteration not only robs the consumer but attacks his health.

Some people have the mistaken impression that almost all food is adulterated. Although the amount of adulteration varies in different states, according to the nature of the Pure Food Law and the efficiency of law enforcement, still the foods which are adulterated are greatly in the minority. Considering the country at large it has been estimated that 15 per cent of the food consumed is adulterated. If this is true, based on an estimate of a $3.00 weekly expenditure per capita, the people of the United States are paying about two and a half billion dollars a year for adulterated, low-grade or inferior food. If we accept the figures of experts who estimate that 2 per cent of adulterated food is injurious to health we find that the American people are paying yearly over $46,000,000 for food which actually brings them definite physical injury.

Comparing present conditions with expert studies made several years ago it appears that Massachusetts saves over a million dollars for the public annually by the enforcement of the Pure Food Law.

Nature and Cause of Adulteration

Food adulteration has now become a highly specialized art. Mixing sand with sugar and making milk out of chalk are not practiced because the detection of such simple fraud is too easy. The man who adulterates food now employs the skill of the chemist and an ingenuity to that of the theater "make-up man" in preparing his products. Coffee has been found which consisted of molasses and flour molded into the

*Extract from an interesting book entitled "Hygiene: Dental and General," by Clair Elsmere Turner, and published by Mosby Company, St. Louis.

shape of coffee berries. American cotton-seed and peanut oil from the Southern states have been sent abroad and refined, then returned to us as pure Mediterranean olive oil. It is only combating the craft of the manufacturer with the skill of the trained analyst that this type of food adulteration can be detected.

Keen competition and the desire for greater profits are important in causing food adulteration. People demand goods out of season and foods from distant parts of the world at cheap prices. The American wants goods done up in fancy packages, stamped with foreign labels, and served in an extravagant fashion. It is no wonder that many food manufacturers have discovered with Barnum that "the public likes to be humbugged."

A Viewer of Auras

After years of investigation and experiment Walter J. Kilner, one of the English occultists, believes that he has been able to substantiate scientifically the claim long ago made that the human body possesses a visible aura. This, he holds, changes its shape and size and color according to various conditions of age and health in the individual.

Mr. Kilner finds that by the use of certain chemical screens this aura may be made visible to the naked eye, and not only so but that the eye may be trained, when once the aura has been seen by the aid of these screens, to see it without any assistance. By means of the color, size and texture of this aura it is held possible to diagnose with wonderful correctness the subject's condition of health or disease. Unfortunately, as the author informs us, photography of the bodily halos has not yet yielded results worth setting forth.

The author offers these results of his researches not as a substitute for a regular medical investigation but as an aid in establishing a correct diagnosis in cases which would otherwise be doubtful. Auras, as he describes and pictures them, would seem to belong to the order of physical phenomena, yet they cannot be identified with light in the ordinary sense, even though said to possess color, and they lack marked polarity or other likeness to electrical activity.

The particulars accumulated by the author contribute to belief in the possible existence of a hitherto unaccepted extension of the human body—of the body rather than of the spirit, it would seem.—*N. Y. Sun.*

Radium as a Safety Element

Radium, the most mysterious and most powerful element known to science, which has the greatest power of all discovered sources of energy, has now been linked with the safety movement and will lend its power to the prevention of avoidable accidents. So great is its power that one gram is sufficient to raise a ton of water from the freezing to the boiling point. If one ton of it were harnessed to a ship equipped with 1500 H.P. engines, the ship would be propelled at the rate of 15 knots an hour for thirty years.

Radium is best known to the world through its curative properties in the treatment of cancer, and through its commercial value in making radium luminous material. The power of radium was made known only a few years ago through the efforts of a Polish woman scientist, and a French and an American professor. Radium now treats thousands of cases of cancer annually, preventing death and eliminating a great deal of suffering.

Radium's role in industry as a life saver is less spectacular, but perhaps even more important, than it is as a therapeutic agent. The great mass of accidents in factories, in mines and in other industrial institutions where darkness is a creator of danger, are being eliminated through the newest invention of science—radio-luminous material. Radium illuminated watches are familiar articles. The same material that illuminates these is now being employed in great factories on all power line switches where fumbling might mean electrocution to the operator.

Radium is the most valuable element in the world—a gram costing $120,000, as compared with $150 for an ounce of platinum. So powerful is it when mixed with other materials that even the minutest particle is effective in making material self-luminous for years. It is this quality which makes radio-luminous material commercially possible.

The great value of radium is due to its scarcity, and to the great difficulty in isolating it after it has been found. Much of the radium of the world is now found in America, in carnotite fields. A great portion of this comes from the radium mines in the Paradox Valley of Colorado.

The ore is found in narrow seams in the ground. It is sorted and packed in one hundred pound sacks and transported sixty miles to the nearest railroad station on the backs of burros and mules. Thence it is shipped in carload lots 2,900 miles across the continent to an extraction plant in Orange, N. J.

Two hundred and fifty tons of ore treated with an equal amount of chemicals and water yields one gram.

The power of radium lies in the penetrating character of its rays,

which disintegrate and travel at the rate of 3,000 miles a quarter of a second.

When other lights fail, when fuses blow out, wires break down, radium will glow dependably without danger of explosion or of burning.

The employment of radium to help solve our medical and industrial problems of life safety is as yet in the first stages of its development. What the future will bring, no one knows.

The Tenant

This body is my house—it is not I.
Herein I sojourn till, in some far sky,
I lease a fairer dwelling, built to last
Till all the carpentry of time is past.
When from my high place viewing this lone star,
What shall I care where these poor timbers are?
What though the crumbling walls turn to dust and loam—
I shall have left them for a larger home!
What though the rafters break, the stanchions rot,
When earth has dwindled to a glimmering spot,
When thou, clay cottage, fallest, I'll immerse
My long-cramped spirit in the universe,
Through uncomputed silences of space
I shall yearn upward to the leaning Face.
The ancient heavens will roll aside for me,
As Moses monarch'd the dividing sea.
This body is my house—it is not I;
Triumphant in this faith I live and die.

FUTURE EVENTS

THE IOWA STATE BOARD OF DENTAL EXAMINERS will meet for the purpose of examining candidates for license to practice in Iowa, at Iowa City, College of Dentistry, beginning Monday, February 7th, 1921, at 9 A. M.

For further information and application blanks, address

DR. C. B. MILLER, *Secretary,*
726 Fleming Bldg., Des Moines, Iowa.

THE TEXAS STATE DENTAL SOCIETY will hold its 41st annual convention on Thursday, Friday and Saturday, March 3, 4 and 5, 1921, at Dallas, Tex.

The Executive Committee is endeavoring to make this meeting an unusually attractive one; and, to that end, will not only utilize the best talent of the Society, but will bring in a few outside men of note.

Clinics will be made a prominent feature.

On Monday following, will commence the Society's Second Annual Post Graduate Class Course, to continue one week, and which will be conducted by the following instructors:

Dr. Rupert E. Hall, Chicago; Dr. F. Ewing Roach, Chicago; Dr. T. W. Maves, Minneapolis; Dr. Arthur E. Smith, Chicago; Dr. Thomas B. Hartzell, Minneapolis; Dr. Clarence O. Simpson, St. Louis.

J. G. FIFE, *Secretary,*
Dallas, Tex.

THE VERMONT STATE DENTAL SOCIETY will hold its next annual meeting in Rutland, on Wednesday, Thursday and Friday, March 16, 17, 18, 1921.

H. B. SMALL, *Secretary,*
Burlington, Vermont.

The next Annual Meeting of the KENTUCKY STATE DENTAL ASSOCIATION will be held in Louisville, Ky., April 13, 14, 15, 1921, Seelbach Hotel as headquarters. A Clinical Program of unusual interest is being arranged.

Address all correspondence to W. M. RANDALL, *Secretary,* Louisville, Ky.

The next annual meeting of THE ALUMNI SOCIETY OF THE DEWEY SCHOOL OF ORTHODONTIA will be held on April 25th and 26th, 1921, at the Hotel Ambassador in Atlantic City. The usual high standard of the meetings of this society will be maintained. Clinics and evening sessions will be included in the program. All interested in Orthodontia are cordially invited to attend these meetings.

GEORGE F. BURKE, *Secretary,*
741-43 David Whitney Bldg., Detroit, Mich.

The fifty-third annual meeting of THE PENNSYLVANIA STATE DENTAL SOCIETY will be held in the Bellevue-Stratford Hotel, Philadelphia, Pa., May

3, 4, 5, 1921. An interesting and instructive program has been prepared. All ethical practitioners are invited to be present.

W. L. FICKES, *Secretary,*
East End Trust Bldg., Pittsburg, Pa.

THE DENTAL SOCIETY OF THE STATE OF NEW YORK will hold the 53rd Annual Meeting at the Hotel Commodore, 42nd St. and Lexington Ave., New York City, May 11, 12, 13 and 14, 1921. All literary exercises, clinics and exhibitions will be staged at the Hotel Commodore.

The Society extends a most cordial welcome to all ethical dentists in New York and sister States.

Make reservations early at the Hotel Commodore.

Exhibitors are requested to address Dr. H. C. Bennett, Chairman of the Exhibits Committee, 576 Fifth Ave., New York City. For further information, address Dr. A. P. Burchart, 52 Genesee St., Auburn, N. Y.

The fifty-fourth annual meeting of THE TENNESSEE STATE DENTAL ASSOCIATION will be held at Nashville, May 17, 18, 19, 20, 1921.

J. J. VAUGHN, D.D.S., *Chairman, Publicity Committee,*
Nashville, Tenn.

MID-WINTER EDUCATIONAL MEETING AND EXHIBIT UNDER THE AUSPICES OF THE CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY

Robert Treat Hotel, Newark, N. J., March 1, 2, 3, 1921

The following program will be presented:

Practical Course in Gold Inlays.....DR. R. H. VOLLAND, University of Iowa
X-Ray Technic and Diagnosis.....By a recognized authority
Physical Diagnosis.....DR. GEO. H. LATHROP, Newark, N. J.
Attachments for Partial Dentures and Saddle Constructions,
DR. G. EWING ROACH, Chicago, Ill.

The following Demonstrative Post-Graduate Clinic Courses will be given by sections of the Detroit Dental Clinic Club:

Denture Prosthesis.....DR. WM. H. GIFFEN, Director
Porcelain Jacket Crowns and Baked Porcelain for Cleanliness in Bridge Work,
DR. ALBERT LELAND LEGRO, Director
Crown and Bridge Work.....DR. WM. H. ELLIOTT, Director

The Essay Program so far includes:

DR. A. W. THORNTON, Montreal, Canada.
Col. ROBT. T. OLIVER, Washington, D. C.
DR. O. W. WHITE, Detroit, Mich.

The courses will be held from two to six each afternoon, and the exhibits will be open from 10 A. M. to 10 P. M.

While the above outline of our program is by no means complete, it will serve to give an idea of the extensive meeting we are planning to hold.